THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—22ND YEAR. SYDNEY, SATURDAY, AUGUST 17, 1935. No. 7.

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URINARY TUBERCULOSIS.[1]

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ALTHOUGH I propose to limit my remarks almost entirely to the discussion of tuberculosis of the kidney and bladder, I am anxious to emphasize the importance of regarding the male genital and urinary systems as one great tract, which must be considered as a whole when we are confronted with tuberculous disease of any of its component parts.

Whenever we see a patient with tuberculosis of the kidney, bladder or epididymis, we must bear in mind the possibility that other parts of the genito-urinary system may be affected. A full examination of the whole of this system should always be made, because of the close connexion that exists between the genital and urinary organs, and the frequency with which disease spreads from one part to another.

Tuberculosis of the bladder, for example, is never primary; it is secondary in the great majority of cases to tuberculous disease of the kidney, although sometimes it is the result of a direct extension from the prostate or *vesiculæ seminales*. Tuberculosis of the epididymis sometimes develops in a patient who has a tuberculous kidney; less commonly the converse holds good and we find that a patient who has old-standing disease of the epididymis ultimately suffers from a similar condition of the kidney. It may be argued that these are separate infections from a focus elsewhere in the body, but in nearly all cases there can be no doubt that they are the result of extension from one part of the genito-urinary tract to another.

[1] Based on an address delivered before the Egyptian Branch of the British Medical Association in Cairo on December 20, 1934.

For the purpose of our discussion we may regard the genito-urinary tract as a railway system and picture the kidney and epididymis as two end stations or termini with the prostate and vesicles as a great junction between them. There is no direct route from the kidney to the epididymis or *vice versa*, but if we carry the simile of a railway system in our minds, we find that from time to time tubercle bacilli will stop at the junction formed by the prostate and vesicles, infect them, and then proceed along a direct route down to the epididymis or up to the kidney, as the case may be. The proof lies in the fact that whenever we find tuberculosis in both the kidney and epididymis, it is always present in the prostate or *vesiculæ seminales* or both.

Rectal examination, therefore, is a very important part of our investigation in a case of disease of the genito-urinary system, and although in many cases of tuberculous kidney we can detect no disease in the prostate or vesicles, when the epididymis is affected the prostate or vesicles, or both, are obviously tuberculous in over 80% of the cases.

This investigation of the whole tract is not merely a matter of academic interest, for it gives us valuable information, whether we are considering diagnosis, treatment or prognosis. For example, if we find evidence of tubercle in the prostate, vesicles or epididymis of a patient suffering from tuberculous kidney, we know that the prospect of curing him by nephrectomy is only half as good as it would be if the kidney alone were involved. In a doubtful case the discovery of a tuberculous focus elsewhere in the genito-urinary tract makes the diagnosis almost certain.

The spread of the infection from the kidney to the prostate probably takes place directly by the tubercle bacilli in the urine, but it is possible that in some cases it extends along the lymphatics lying round in the wall of the ureter. From the prostate and vesicles the bacilli pass downwards in the lymphatics round the vas to the *globus minor* and then return upwards along the lumen of the vas. If the disease spreads from the prostate and vesicles to the kidney, the bacilli usually pass upwards in the lymphatics, round and in the wall of the ureter; but occasionally the mucosa is involved and the infection gradually spreads upwards along the lumen of the ureter.

We thus see the importance of regarding the genito-urinary system as a whole, and looking upon the prostate and *vesiculæ seminales* as important connecting links between the kidney and epididymis.

Symptoms.

It will perhaps be convenient and useful from a practical standpoint if we take one by one the various symptoms and physical signs which may lead the patient to consult us. In this connexion it is important to remember that in the great majority of cases of tuberculosis of the kidney the patient complains of symptoms referred to the bladder: that is to say that frequency of micturition, with or without pain during the act, is as a rule the reason which brings the patient to a doctor.

Frequency of Micturition.—Frequency of micturition is usually the first thing which calls the patient's attention to the fact that all is not well with him. It is at first unaccompanied by pain, but as the bladder becomes involved pain becomes a prominent feature and may be very severe. In the early stages the frequency is more pronounced by day than by night, and many patients think little of the slight inconvenience. They may consult you because they think that they are passing too much urine, and ask for a bottle of medicine to put it right.

I need not impress upon you the importance of examining the urine in such cases. In tuberculous disease it will be acid, hazy, and on standing there will be a small deposit of pus. Microscopic and bacteriological examinations of specimens taken with aseptic precautions should then be made, and if the report should be that, although pus is present, the cultures have remained sterile, the probability that the patient has a tuberculous kidney is very great.

Failure to find tubercle bacilli on one occasion is of little import; further specimens should be examined, and it is now necessary to collect in one vessel all the urine passed during twenty-four hours and examine a sample of the deposit. If two or more such examinations are made with a negative result, a guinea-pig should be inoculated. This will often give a positive result when routine microscopic examination has failed.

In any case tuberculosis of the kidney cannot be excluded until a complete examination of the urinary tract, including cystoscopy, pyelograms, and so on, has been made, for not infrequently the condition can be diagnosed apart from finding tubercle bacilli in the urine.

Frequency of micturition, therefore, associated with pus in a sterile urine is an early sign of tuberculous disease of the kidney.

Pyuria.—I need not enlarge on what I have already said, but I would draw your attention to the possibility that there may be so little pus in the urine that it is overlooked on a cursory examination, and the slight haze it produces is regarded as being of no consequence. Patients are sometimes sent up with a note from their doctor saying that they are suffering from frequency of micturition and albuminuria, but no reference is made to the presence of pus, which, however, plays such an important part in the preliminary diagnosis.

The following case is of interest as showing the insidious onset of the disease and how readily it may be overlooked.

A young man who was being examined for life insurance had a haze in the urine. It was attributed to chronic prostatitis and in spite of his indignant denials he was informed that it was the result of gonorrhœa. He was condemned to a long course of massage and irrigation, but made no improvement. Ultimately a careful and complete urological examination proved that he had a tuberculous kidney. I carried out a nephrectomy and he has remained well.

Hæmaturia.—Hæmaturia is commonly met with in advanced tuberculous disease when there is extensive ulceration in the bladder, but sometimes it occurs in very early cases, and then it comes from the kidney. Cases have been reported in which a patient has suddenly had an attack of hæmaturia with no other symptoms. Examination of the urine, routine clinical and X ray examinations and cystoscopy all proved negative and the unsatisfactory diagnosis of essential or unexplained hæmaturia was made. Some six or twelve months later, however, other symptoms developed which left no doubt that the original attack of hæmaturia was due to tuberculosis of the kidney. At this point I cannot emphasize too strongly the importance of making a full clinical investigation of these patients with a view to excluding tuberculosis elsewhere; the lungs, bones, joints, spine and lymphatic glands should all be examined. Should there be evidence of past or present tuberculous disease outside the genito-urinary tract, we must regard the case as probably one of tuberculous disease of the kidney, even if the urological report is indefinite. These cases of hæmaturia are rare, and in my experience are most commonly met with in young subjects, but with modern methods, and in particular the use of intravenous pyelography, a correct diagnosis can usually be reached. Unexplained hæmaturia, therefore, particularly in young subjects, may be due to renal tuberculosis.

Renal Colic.—Severe attacks of renal pain may make the patient seek advice, but in these cases we shall generally find gross evidence of disease, such as painful and frequent micturition, pus in the urine, and so on. The renal colic in these cases may sometimes be due to obstruction of the ureter by caseous material, but more frequently it is due, I think, to an attack of congestion of a ureter whose lumen is already greatly narrowed. In this connexion the following case is of interest.

The patient was a lady of forty-five who had undergone nephrectomy five years previously. When I saw her she had advanced tuberculosis of the bladder and the remaining kidney. Tuberculin was given, but the injection was followed by severe renal pain, which was associated with complete suppression of the urine for twenty-four hours. Two other injections were given, but each was followed by similar severe pain and suppression of urine. The tuberculin was stopped and she had no further attacks.

The sequence of events suggests that the lumen of the ureter was already seriously constricted and that the tuberculin caused congestion of the ureter, which narrowed the lumen still further and so led to complete obstruction.

Progress of the Case.

It is important to realize that a patient with tuberculous disease of the kidney does not necessarily go steadily down hill, although a large proportion of these patients do so. Wildbolz found that out of 126 patients with urinary tuberculosis treated medically, 99, or over 80%, were dead in two years. On the other hand, the condition may improve, and in some cases the patients may lose all their symptoms for a number of years and, so far as they know, become perfectly well. The two following cases are examples.

Miss P., in December, 1929, had had painful and frequent micturition for six months. She had to empty the bladder every half hour during the day and every hour at night. There was tuberculous ulceration round the orifice of the left ureter, the orifice of the right ureter was œdematous, and indigo-carmine injected intravenously did not appear from the left ureter for fifty-three minutes. At the present time, five years later, she is free from symptoms, sleeps through the night without being disturbed, and can retain her urine for four hours during the day. Intravenous pyelograms show that the right kidney is normal, but characteristic mottling is to be seen in the region of the left kidney, which is largely functionless.

It is worthy of note that there are calcareous deposits in the position of the left ureter, opposite the transverse process of the fourth lumbar vertebra, and also opposite the spine of the ischium.

Miss H., in December, 1926, had great pain and frequency of micturition. Cystoscopy showed extensive ulceration of the bladder and bullous œdema round the orifice of each ureter. The bladder held only 90 cubic centimetres (three ounces). At the present time, eight years later, she feels well, has no symptoms and does not pass urine more frequently than five times in the twenty-four hours. The bladder now holds 240 cubic centimetres (eight ounces) and is normal on cystoscopic examination. X ray examination, however, shows a large kidney of irregular density, the darker patches being due in all probability to caseous masses or inspissated pus and a few calcareous deposits. Of great interest is the extensive calcification of the ureter, which is seen to extend from the kidney to the level of the first sacral vertebra.

Closed Renal Tuberculosis.

The two cases recorded above are examples of what is known as closed renal tuberculosis, that is to say, that although the kidney is tuberculous, the disease is shut off from the bladder. There are no symptoms, as tubercle bacilli have ceased to pass down the ureter, so that the bladder has been able to recover from its ulceration and regain its normal condition.

Closed renal tuberculosis is generally the result of changes in the ureter or pelvis of the kidney which lead to obstruction or even obliteration. Less commonly the affected part of the kidney may be shut off and have no communication with the renal pelvis.

These patients, however, must not be regarded as cured, in spite of their freedom from symptoms.

In 1922 I operated upon a man and excised a solitary ulcer from the fundus of the bladder which on microscopic examination proved to be tuberculous. Clinical and X ray examinations were negative and there were no symptoms apart from hæmaturia. He made a good recovery and remained well for ten years, when his hæmaturia recurred and was associated with frequency of micturition. The right kidney was undoubtedly tuberculous, and in my absence in August, 1932, Dr. Dix operated for me and removed it. The kidney was found with difficulty; it was roughly circular and only five centimetres in diameter; on section it consisted of a capsule of fibrous tissue, some caseous areas and a cavity the size of a plum and full of creamy pus. The ureter was patent. The patient made an excellent recovery and has remained well.

Such atrophy is rare in tuberculous disease, but the case demonstrates the length of time during which the disease may remain latent and then become active with reinfection of the bladder and a return of the patient's symptoms.

But apart from the question of a relapse, as in this case, we must remember that a kidney with massive tuberculous infection is a serious danger to the patient, for there is always a possibility of the infection spreading to other parts of the body, and occasionally miliary tuberculosis occurs with a fatal result. Still further, if the kidney is in a state of pyonephrosis, there is the danger that the abscess may burst through the capsule of the kidney and give rise to a perinephritic abscess.

In view of these possibilities we cannot regard a case of closed renal tuberculosis with complacency. In all cases a full urological examination must be made, and although it may be difficult to convince the patient of its necessity, the question of nephrectomy must be seriously considered.

If the opposite kidney is normal and free from infection and if there is no obvious focus of tuberculous disease elsewhere, the prospect of a permanent cure by nephrectomy is excellent.

Tuberculous Bacilluria.

It has been proved beyond question that a urine which contains pus and tubercle bacilli is always evidence of tuberculous disease of the kidney, in the absence of gross tuberculous disease of the prostate. If, however, the urine is free from pus, is the kidney necessarily tuberculous or can the bacilli be excreted by a normal kidney?

Medlar injected tubercle bacilli into the veins of certain animals and found that if the bacilli were subsequently discovered in the urine he was always able to demonstrate a tuberculous lesion in the kidney. They were often small, in some cases microscopic, but a lesion, large or small, was always present. Further, in more than half of a number of kidneys which showed obvious tuberculous disease he found small fibrous scars which, he suggests, were originally miliary tubercles which had undergone cure by fibrosis. Helmholz and others have done much experimental work which goes to prove that organisms are not excreted by a normal kidney.

We may assume that the presence of the tubercle bacilli in the urine always connotes tuberculous infection of the kidney, but that in the absence of pus the lesions are very small, and if a full investigation of the kidneys gives no other evidence of past or present tuberculous disease, there is a reasonable prospect that the condition will yield to medical treatment and be cured, but this happy result can be anticipated only in certain circumstances. First, there must be no pus in the urine, or only a trace, for, if present in any quantity, it indicates the breaking down of a tuberculous focus of an appreciable size, and complete recovery is unlikely. Second, X ray examination, including pyelograms, should show that the outline of the kidney, its pelvis and calyces are normal and that there is no evidence of old-standing tuberculous disease. Third, if a primary focus is found in some other part of the body, excluding the lungs, it must be small and easily controlled. Fourth, the patient must be placed under adequate supervision in favourable surroundings.

Treatment.

I have already referred to the serious nature of the prognosis if these patients are treated on medical lines alone, and have quoted Wildbolz, who found that 80% of patients treated in this way died within two years. Operation, so far as our knowledge extends at the present time, is the only treatment which holds out the possibility of cure, if we exclude the rare cases of tuberculous bacilluria. At the same time it must be remembered that renal tuberculosis does not invariably go steadily down hill. Intermissions of months or even years may occur during which the patients are comfortable and may believe themselves to be cured, as in the cases to which I have referred under the heading of closed renal tuberculosis.

Before operation is advised there are many things which have to be taken into consideration in deciding whether nephrectomy is likely materially to benefit the patient or not.

In the first place a careful clinical examination must be carried out and a search made for evidence of tuberculosis elsewhere. Active tuberculous disease in the lungs is a contraindication to operation, for these patients do badly, ulceration of the bladder is slow to improve, and there is a great probability that the remaining kidney will be affected before long. If the disease in the lungs is quiescent, operation may be performed, but the prospect of an ultimate cure is not very good. The bones, joints, spine and lymphatic glands should also be examined for evidence of disease, and if the patient is a man it is important to examine the prostate, *vesiculæ seminales* and epididymes.

If the disease is in an acute phase, it is wise to send the patient to bed and to treat him medically until the acute symptoms have subsided. His recovery from the operation will be smoother and there will be less prospect of serious delay in the healing of the wound. A most distressing sequel of the operation is sometimes seen in a total failure of the wound to heal; it gapes widely and is covered with unhealthy tuberculous granulation tissue. The outlook is serious and some patients die from miliary tuberculosis. Months or even a year may elapse before the wound heals, and local treatment seems to have but little effect. This complication is particularly likely to occur if nephrectomy is carried out when the infection is in an acute phase; and the escape of tuberculous pus or even bacilli into the wound during the operation is an important predisposing factor.

The condition of the other kidney must be fully investigated to prove that it is capable of maintaining the normal renal excretion, and also to exclude the possible presence of tuberculous disease.

The efficiency of this kidney can be estimated by the injection of indigo-carmine. If this is given intravenously it should appear in the urine in from four to six minutes. This is in general a very satisfactory test, but it is not infallible. A positive result is reliable, but if there is considerable delay in the excretion of the dye it is as well to apply a urea concentration test by estimating the percentage of urea in a specimen obtained by a ureteric catheter after a preliminary draught of fifteen grammes of urea.

The urine should not only be free from tubercle bacilli, but it should also contain no pus. If pus is present, even if no tubercle bacilli are found, one must regard the kidney as tuberculous. In the event of any doubt a guinea-pig should be inoculated.

The Operation.

With regard to the operation itself, I make a practice of removing the ureter in its whole length with the kidney. It is true that when a large tuberculous focus has been removed from the body, the healing of other foci is greatly facilitated, but recovery does not always take place in the affected ureter, and it appears to me that to remove the kidney and leave a tuberculous ureter is not sound surgery. If at the time that nephrectomy was performed every ureter had reached the stage of atrophy, ureterectomy would not be necessary; but unhappily some are ulcerated, others greatly thickened and others again are dilated and contain infected urine or even pus.

The ureter is easily exposed at its junction with the bladder through a grid-iron incision low down in the iliac region. It is divided between ligatures by a cautery, and the upper end is separated up to the level of the pelvic brim. The patient is then turned on to his side and the kidney is removed; the ureter is easily freed downwards to below the level of the crest of the ilium and then drawn out of the wound. During the operation it is important to remove with the kidney as much of the fatty capsule as is convenient, and to avoid breaking down any adhesions that may exist between the fat and the kidney for fear of opening a tuberculous focus.

As examples of the harm a tuberculous ureter may do, I need mention only two cases.

The first was that of a man of twenty-seven, suffering from a large pyonephrosis. Nephrectomy was performed, but the ureter was not removed. The wound broke down and he had a persistent sinus for two years. I then removed the ureter, which was much thickened, and the sinus was firmly healed in a few weeks.

The second was that of a woman of thirty-five. Twelve months after nephrectomy she still had ulceration of the bladder in the neighbourhood of the corresponding ureteric orifice. I removed the ureter, and the bladder slowly recovered.

Removal of the ureter does not greatly increase the duration of the operation, and if a muscle-splitting exposure is employed there is no danger of a ventral hernia. So far as my personal observations go, the patients suffer from no ill-effects, either immediate or remote, from this extension of the operation.

Progress after Operation.

Provided that the wound heals by first intention, as is usually the case, attention will be focused on the bladder. Sometimes the bladder lesions heal remarkably quickly, and it is common for patients only two or three days after the operation to say that micturition is already far less painful and that the frequency is much diminished. The three following cases may be mentioned as examples of rapid recovery.

A woman of forty-eight (F.S.) said that she had had to pass water every three-quarters of an hour by day and night. She was able four weeks after the operation to sleep through the night without being disturbed.

A man of forty-six (G.C.) had a testis and epididymis removed for tuberculous disease nineteen years previously. For three months before admission to hospital he had had to rise three times at night and empty the bladder eight times during the day. Cystoscopy revealed extensive ulceration round the orifice of the left ureter. Two weeks and a half after nephrectomy the ulceration was healed.

A man of thirty (L.S.) had intense injection round the orifice of the right ureter and superficial ulceration over an area 1·25 centimetres (half an inch) in diameter. On the day following the operation his bladder symptoms had disappeared, the urine was clear, and to the naked eye free from pus.

On the other hand, the ulceration may persist, and, although the patient's condition is improved, frequent and painful micturition may continue to distress him. In some cases this is due to the presence of an active focus elsewhere (for example, in the lungs), in others to tuberculosis in the remaining kidney; and yet again it may be maintained by infection from the ureter, if this has not been removed in its whole length. In some no active focus can be found, the whole of the ureter may have been removed, and the remaining kidney may appear to be free from infection, but the ulceration of the bladder persists. This last type of case can probably be accounted for by a low resistance on the part of the patient, which renders him unable to overcome the infection which has already invaded the bladder.

There is yet another group in which the bladder has become permanently contracted as a result of interstitial fibrosis, and for these patients but little can be done.

After-Treatment.

Careful medical treatment is of the greatest importance in consolidating the advance made by removal of the diseased kidney.

If the ulceration in the bladder persists, not only does it cause much distress, but it may lead to an ascending infection of the other kidney by the lymphatics or directly along the mucous membrane lining the ureter.

Prolonged rest, suitable diet, and in some cases sanatorium treatment are of great assistance in enabling the patient to make a complete recovery; at the same time any tuberculous focus outside the genito-urinary tract should receive appropriate treatment. We must always remember the importance of the remaining kidney and do everything

possible to control any tuberculous foci which may still be present in the genito-urinary tract or in any other part of the body; in this way we shall diminish the chance of infection of that kidney.

Tuberculin is valuable in persistent ulceration of the bladder, but only if given in doses which are so small that they do not excite any reaction. If the dose is too large, the bladder symptoms are exaggerated, hæmaturia occurs, and the patients go down hill.

The treatment of persistent ulceration of the bladder taxes all our ingenuity. Urinary sedatives should be given, such as hyoscyamus with buchu and potassium carbonate, and I have often found santal oil in combination with methylene blue useful.

The diet must, of course, be plain and non-irritating, alcohol and such things as curry, hot sauces, pepper, and so on, must be rigidly avoided.

Lastly, as in all other cases of cystitis, when the condition is acute much relief is obtained by prolonged rest in bed.

If the ureter has not been removed with the kidney, ureterectomy may be carried out. This procedure has been followed by excellent results in some cases, but it is not always successful.

Fulguration has been recommended for persistent ulceration of the bladder, but I have found it disappointing.

Prognosis.

The mortality of the operation is stated to be 5%, but as in all statistics of operative mortality, this includes a number of bad risks, so that in favourable cases the mortality is considerably less.

Permanent cure, as estimated by Swift Joly in a valuable article on the prognosis after operation, is in the neighbourhood of 50%, while death directly due to extension of the disease to the remaining kidney is probably about 15% to 20%.

Reference has already been made to the bad prognosis in cases in which there is a focus of active disease in the lungs; children also do badly.

If the patient is a man, the prospect of cure is much diminished if there are signs of disease in the prostate, *vesiculæ seminales* or in either epididymis. If the epididymis on the same side as the affected kidney is involved, epididymectomy should be performed and the vas removed down to the neighbourhood of the bladder. This is easily done through the grid-iron incision which is made for the exposure and division of the ureter.

In cases of involvement of one epididymis it has recently been advised that the vas on the sound side should be ligatured and divided, in order to prevent the extension to the opposite epididymis which so frequently takes place.

Inoperable Cases.

If both kidneys are affected, if there is an active focus in the lung, or if for other reasons operation is considered inadvisable, the conduct of the case should be mainly on the lines indicated in the section on treatment after operation.

Prolonged rest in bed, possibly for several months, is advisable in many cases. It is admittedly tedious, but it is of great value if combined with a generous diet, fresh air and carefully regulated heliotherapy. The climate should be warm but temperate.

If tuberculin is exhibited, it should be given in minimal doses, otherwise it does harm. It is far better to withhold it altogether than to give a dose which may be followed by serious consequences.

Throughout this paper I have based my remarks on my personal experience of renal tuberculosis as met with in England. Variations occur in the incidence and severity of the disease in different parts of the world, so that the treatment and prognosis of this disease vary with surgical experience in different countries. I therefore offer these remarks in no dogmatic spirit, but in the hope that they may prove of interest to those who chance to read them.

THE DIAGNOSIS AND TREATMENT OF URINARY TRACT INFECTIONS.[1]

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General Considerations.

IN the study of infections of the urinary tract several basic factors emerge; the most important of these is obstruction. The urinary tract should always be regarded as a whole; that is, as an elongated hollow tube of varying calibre, with the bladder interpolated much as the rubber bulb in such a mechanical tubular system as an ordinary Higginson's syringe. In the presence of infection one should always ask: "Is there any stenosis, or even relative narrowing, at any point distal to the district in which infection is discovered?" Thus, for example, renal infection, bilateral or even unilateral, may have as its underlying cause obstruction at the bladder neck, in the posterior or anterior portions of the urethra, or even at the external meatus in either sex.

Infection, however, may not be secondary to obstruction, and in such an event we are more especially interested in the possible paths of entry of infection into the urinary tract. The well recognized modes of entry are: (i) By direct implantation, as in gonorrhœa, direct infection of the female urethra by vaginal pus, direct infection of the urethra, bladder or even the kidneys by a contaminated catheter, infection through accidental or surgical wounds and, finally, direct extension of infection from neighbouring organs. (ii) Hæmatogenous infection. The organisms enter the blood stream from a focus in the teeth, sinuses, tonsils

[1] A post-graduate lecture delivered at the Royal North Shore Hospital of Sydney on May 29, 1935.

or intestine. It is important to secure cultures in all cases in order to distinguish colon bacillary from Gram-positive coccal infections. (iii) Lymphatic infection. Some intestinal and some renal lymphatic vessels run to common lumbar lymphatic glands, so that infection is conceivable by this path. In the female, communication may occur between lymphatics of the uterus and those of the bladder.

Extension of an infection that has once entered the urinary tract has for many years caused great discussion. Naturally descending infection is the rule, since the infected stream of urine runs downwards. It is possible that conveyance by mural and perimural lymphatics may account for some descending infections. Extension by actual contiguity along the mucosa may also be a factor in descending infections.

Ascending infections may occur by contiguity along the mucosa, by ascent through the lymphatics or by the blood stream through the general circulation. Infection cannot travel up the lumen of the ureter to the kidney unless reverse peristalsis occurs or unless there is actual stagnation of the urinary flow; finally, actual backflow from bladder to kidneys, known as ureteric reflux, may occur through incompetence of the uretero-vesical valves.

Nature of Infection.

There is not space in this paper to deal with more than the most commonly occurring infections, namely, the colon bacillary and coccal infections. Reference to text books may be made if information is required on infections due to organisms such as the *Bacillus proteus, Bacillus pyocyaneus*, diphtheroid bacillus *et cetera*.

Colon Bacillus Group.—If the gonococcus is excluded, then a study of any large group of urinary tract infections will show that in a majority, perhaps up to three-quarters of all cases, infection is due to Gram-negative bacilli, usually of the colonic group. In about two-thirds of such cases the infection is pure, in one-third it is mixed, mostly with Gram-positive cocci. Bacilli of the colon group usually occur in acid urine, but this is simply because the reaction of the urine is usually acid; these particular germs do not alter its reaction.

Gram-Positive Coccal Group. — Gram-positive coccal infections come next in order of frequency, always excluding gonococcal infection. Staphylococci occur far more frequently than streptococci. In about one-half of all cases of Gram-positive coccal invasion the infection is pure. The great majority of staphylococci do not decompose urea and so most of them fail to produce an ammoniacal urine; in most cases, therefore, the urine reaction is acid. Staphylococcus septicæmia may arise from urogenital tract infections and is much more fatal than that due to the colon group of bacilli. Of the streptococcal group the hæmolytic varieties are the most virulent. Rosenow has demonstrated the extraordinary specificity of streptococci in relation to particular lesions. Thus streptococci from a human being suffering from renal calculus will cause renal calculi to occur when injected into an animal, and so on.

History.

In eliciting a history from the patient in cases of urinary tract infections, it is interesting to note the varying manner in which different patients react to the appearance of certain signs and symptoms. These observations also constitute a warning to the medical man to make sure (i) that he does not mislead the patient by questions which are not clearly understood, and (ii) that the patient does not forget to mention certain signs or symptoms which may have appeared, but which the patient, simply because he considers them of no significance, fails to mention.

Therefore in all urinary tract case-taking one should proceed in an orderly manner from above downwards, once the patient has made his voluntary complaint, and ask for a history of certain renal, ureteric, vesical, male adnexal and urethral signs and symptoms. A simple scheme of this kind is easily and quickly run through, and it has the inestimable value that nothing of significance is missed.

An outstanding and striking example of the failure of many laymen, even the highly intelligent, to feel what should be natural alarm at the appearance of an important sign is afforded by the phenomenon of hæmaturia. Provided the hæmaturia is not very profuse and that it is not inordinately protracted and, above all, provided that it is not accompanied by pain, a surprising number of patients are not alarmed by it at all. It is even more surprising to observe that some medical men still persist in prescribing sedatives and placebos for hæmaturia and let the whole matter drop once the hæmaturia has subsided, instead of insisting on a thorough urological examination in all cases of hæmaturia. As opposed to the above statement, we can say that nowadays the majority of medical men are fully apprised of the possible dangers associated with hæmaturia, and know that while it is frequently associated with infections, particularly those connected with calculi, it may, however, be an outward sign of neoplasm somewhere in the urinary tract. At the same time the public is becoming better educated to the significance of such matters, and laymen, in increasing proportion, are becoming alarmed by the issue of blood from any part of the body.

Similarly, very few patients voluntarily complain of the presence of turbidity of the urine, though they seem to notice turbidity if it is associated with an offensive smell.

We can therefore make the interesting observation that certain signs are considered of alarming significance by the patient if accompanied by subjective symptoms which entail interference with his bodily comfort.

When the patient's complaint has been recorded, he or she should be questioned as to the presence

of loin, flank or iliac pain (reno-ureteric) and as to characteristic radiations to testicle, vulva or thigh. Then questions should be asked as to variations in the amount of urine secreted and the relation of such variations to possibly corresponding variations in renal pain, the background thought being intermittent renal or ureteric obstruction. In this connexion the frequency due to polyuria should be distinguished from that due to vesical irritation; in the latter the amount of urine passed at each micturition is very small.

History of pain or discomfort suprapubically, perineally or in the urethral area is sought for, and its relation to the act of micturition is accurately determined.

The symptoms of frequency and difficulty in urination should be carefully inquired into, if they have not already been volunteered in the complaint. Here another warning is issued. Patients very commonly misunderstand what we mean by difficulty in urination, and confuse this simple mechanical conception with questions of discomfort, actual pain or painful spasms associated with urination. Medical nomenclature and usage have unfortunately contrived to cloud what should be simple conceptions by the use of the term "dysuria", supposed to mean painful micturition, difficult micturition, or painful and difficult micturition, according to the varying ideas of the person using the term. The term "dysuria" should be dropped altogether, and the symptoms of pain (sometimes associated with spasm) and difficulty should be put into entirely separate compartments.

The relation of either of these symptoms to phases of the act of micturition should be determined.

Finally, the character, size (that is, the diameter) and force of the urinary stream, so far as the male is concerned, should be determined in relation to what the patient was used to in his youth. Exceptionally, certain patients with congenital obstructive lesions may give a history of having had a thin and weak stream as long as they can remember; they derive their standard of normality from the observation of others.

Collection and Examination of Specimens.

In the female a catheter specimen is necessary. The catheter should be of rubber and well lubricated with an oxycyanide of mercury jelly lubricant, so that the microscopic appearance of even a few red cells does not mean slight catheter trauma, but actual hæmaturia. After cleansing of the mucosa around the external meatus, the latter should be inspected and any stenosis or other abnormality should be noted. After catheterization, a vaginal examination is made; the base of the bladder, the trigone and the urethra are palpated as the finger descends the anterior vaginal wall, while in the lateral and anterior fornices the lower ends of the ureters are palpable. Finally, by an outward milking action of the finger, pus in the urethra or paraurethral channels, if present, will be expressed on to the surface.

In the male, urine should always be passed into two large sterile specimen glasses; this is obligatory, yet often neglected. Contaminating pus from the urethra and male adnexa is swept into the first glass, so that the contents of the second glass may in most cases be considered as vesico-renal. It is preferable that the patient should be able to pass at least five or six ounces into the first glass, so that the urethra is swept clean. The presence of shreds or of a cloud of pus in the first glass, with clean urine in the second, indicates a urethral, prostatic or seminal vesicular origin for the infection. This applies only when such infections are quiescent, for when they are acute or even subacute, both glasses will be hazy as well as containing shreds. In renal and vesical infections fine shreds are not present, and any haze or turbidity due to pus or bacteria is equally distributed in both glasses.

After application of the two-glass test in the male a catheter should be passed in order to "sound" the urethral canal and to determine the presence and amount of residual urine. One should always have on hand numbers 7, 8 and 9 English size rubber catheters of the Tiemann variety; these are of firm rubber and have elbowed, olivary tips. A simple prostatic stylette will impart a bold "prostatic" curve to the largest of these catheters (9E), for use in cases of prostatic obstruction, though often the smallest (7E), used without a stylette, will pass more easily. When urethral obstruction due to stricture is encountered, flexible silk-wove filiform bougies are necessary, in sizes 3 to 6 French gauge, bent at the tip to simple *coudé* or bayonet shape.

Once the presence or absence of residual urine has been determined in the male, rectal palpation of the prostate and seminal vesicles should be performed. This should never be omitted in any urinary tract case-taking, and every opportunity should be taken to improve one's capabilities of correct diagnosis in affections of these organs. The examining finger should also palpate the trigonal region of the bladder just above the middle of the upper border of the prostate and the lower portions of the ureters as they pass just medial to the fundi of the seminal vesicles.

If microscopy of the expressed secretions of the prostate and vesicles is considered necessary, one should first of all irrigate the anterior part of the urethra with a weak antiseptic lotion, then fill and clean the bladder either through a catheter or by pressure irrigation. The prostate and vesicles are then stripped in a medial and caudal direction while the patient bends forwards with the cleansed penis lying inside a sterile specimen glass. A drop of the secretion should be caught on a glass slide, spread out, fixed and stained, while a further drop may be used for culture.

Naked-eye examination of the urine is made immediately after its passage and again after several hours' standing. Turbidity from the presence of phosphates or of urates can be excluded by acidifying and heating respectively; if the turbidity remains after these tests it may be considered as due to pus,

and the degree of turbidity should be noted down as slight, medium or heavy. There may be a "drifting mist" haze, rather than actual turbidity, and this is characteristically due to bacteriuria. The character of the deposit and of the supernatant urine after several hours of standing should also be noted. A very large deposit of granular pus usually means pyonephrosis or else a diverticulum of the bladder. Haziness of the supernatant urine points to bacteriuria. Admixture of mucus with a deposit of pus means vesical participation in the infection.

Microscopy should include immediate examination of a wet film, so that crystals are not overlooked and so that any renal casts may be observed in their fresh unstained state. If desired then the wet film may be evaporated and fixed; it may later be stained at leisure by the Gram method, so that ordinary pyogenic bacteria may be intimately studied. Culture is added if desired. Special centrifuging is necessary to demonstrate the tubercle bacillus by smear. I have found the most satisfactory method to be a high speed (about 5,000 revolutions per minute) for a quarter of an hour. The Ziehl-Neelsen staining method is used.

Physical Examination.

Like the history-taking, the physical examination should be systematic and proceed from above downwards. Palpation is the most important method. Each kidney is palpated unimanually and then bimanually, and the sensations elicited on each side are compared. Swelling, œdema and localized muscular rigidity in the loin, as signs of perinephritic infection, should never be overlooked. The ureter is palpated in the iliac region; if thickened or enlarged it may be felt as it crosses the pelvic brim, but even if it cannot be felt tenderness will be elicited if it is inflamed.

Reference has been made in the previous section to vaginal and rectal palpation of the lower end of the ureter in the female and male subject respectively.

The floor of the bladder and the urethra in the female are palpated vaginally; the floor of the bladder and the membranous urethra are palpated rectally in the male.

The male internal genital organs are palpated rectally, as previously described, while the testis, epididymis and spermatic cord are also carefully felt, so that any nodularity or tenderness is not overlooked.

Radiological and Endoscopic Examination.

Many simple urological cases, or cases which are only doubtfully urological, may nowadays be much more fully studied by the man in general practice, and so need not be referred to a urologist at the very beginning. The attitude of general practitioners to cystoscopy has always varied a good deal, some men never using this examination at all, while, on the other hand, some are quite fond of performing cystoscopy.

Endoscopic examination with a small cystoscope is a fairly simple matter, provided ureteric catheterization is not added. Previous reports on plain radiograms of the urinary tract and excretion urograms, together with a preliminary intravenous or intramuscular injection of indigo-carmine, make cystoscopy quite an illuminating procedure, even when divorced from ureteric catheterization.

The difficulty with most of these examinations is not their performance but their interpretation. For instance, the blue efflux of indigo may not spurt from the ureters during the examination, yet would appear quickly if catheters were passed up to the kidneys, a temporary inhibition from instrumentation having occurred. A preliminary excretion urogram, however, has given us a good idea of the functioning capacity of each kidney. Anatomical delineation of the kidneys and ureters is, however, not to be expected in many excretion urograms, and the difficulties of interpretation may be so great that cystoscopic (that is, retrograde) pyelography becomes necessary. In cases of infection particularly, separate collection of renal specimens by ureteric catheters is also necessary for proper diagnosis. Therefore we see that after a certain point the aid of the urologist is advisable.

However, plain radiograms followed by excretion urograms should be secured, with reports by the radiologist, before the patient is sent to a urologist, and this particularly applies to patients living in the country, for the practitioner may post the radiograms to the urologist, together with a history of his clinical and microscopic findings. It very often happens in such cases that the urologist considers that nothing serious is amiss, and so the patient is saved a trip to the metropolis.

Simple cystoscopy is very useful in determining whether the cause of symptoms is purely vesical, but here again interpretation is apt to be difficult, especially when the mucosa is much altered from the presence of inflammation. For a description of cystoscopic technique and the interpretation of cystoscopic appearances may I refer the reader to a personal article in *The Journal of the Sydney University Medical Society*, March, 1927, while the indications for and interpretation of excretion urography are dealt with in an article in THE MEDICAL JOURNAL OF AUSTRALIA of October 29, 1932.

Diagnosis.

Renal Infections.

In fulminating renal infections loin pain is present, accompanied by high fever, rigors and prostration. Naked-eye pyuria may not be present. The pain may not be severe and hæmaturia is by no means constant, so that the clinical picture may be simply that of an acute general infection, with the focus of origin not immediately apparent. In all acute intoxications, therefore, the urine should be carefully examined by microscopy and culture.

In ordinary acute renal infections a rigor is often the first symptom, and a remittent type of fever is nearly always present. Pain is a variable

symptom and may be absent. Ureteritis may accompany the acute renal inflammation and, in conjunction with the passage of clots of blood or pus, may lead to renal colic by obstruction.

Chronic renal infections are often considered as chronic pyelitis only; this may be so, but more often the lesion is a pyelonephritis. A chronic ureteritis is often present, but has no distinctive features of its own. Hæmaturia is rare in chronic renal infections, except when a calculus is present or during an acute exacerbation. Fever is absent when pus escapes freely, but if it is dammed back the temperature rises. Intermittency of pyuria and of fever is characteristic of renal infections.

It should never be forgotten that vesical symptoms may be the only prominent ones, even though the origin of the trouble is renal; this is well recognized in tuberculous infections of the urinary tract, but is often equally true in ordinary pyogenic infections.

In severe bilateral infections, after some time uræmic symptoms supervene, and may be confused with those due to the general intoxication. Therefore in severe chronic cases tests of renal efficiency, both of retention and excretion, should be applied.

I should like to refer to perinephritic infections before leaving this section. These infections may arise by hæmatogenous route from a distant source, or else may be an extension from a cortical renal infection. The inflammation may proceed to abscess formation, but, even before this, symptoms of intoxication may appear, for there is no avenue of drainage. The pain due to perinephritis is localized to the posterior renal area and does not radiate. There is local tenderness, swelling and even œdema, while an important sign is rigidity of the corresponding para-spinal muscles. The psoas muscle may be involved with flexion of the thigh, and pain is felt when extension of this part is attempted.

Vesical Infections.

At the outset let me issue once again the warning that vesical symptoms are often the most noticeable outward manifestation of primary trouble in one or both kidneys; less often, bladder infection is secondary to infection residing primarily in the male internal genital organs, while in the female the urethra is not seldom the primary seat of infection.

Patients will often take no notice of a slight increase in the frequency of urination, but should any pain or discomfort attend the act, they will seek advice. Excessive frequency will naturally bring the patient to his medical adviser, since physical or social inconvenience is caused. As mentioned earlier, turbidity of the urine from pyuria or bacteriuria is often disregarded by the patient, though an offensive smell will cause alarm.

Frequency of urination is usually worse in the day time in actual vesical inflammation, since movement increases vesical irritability. In very severe inflammation urgency of micturition or even tenesmus and strangury appears.

Hæmaturia occurs in very acute cystitis and in cases with ulceration or granulation tissue formation. It is a mistake to consider that blood always appears at the end of micturition in vesical inflammation; this is certainly the case where there is disturbance of the muscular contraction, but the blood is often well mixed with the urine.

When fever is present, a renal or male internal genital infection should be excluded as the cause and perivesical inflammation should enter into consideration also.

Infections of the Urethra and Male Genital Organs.

The urethra and the male genital organs are both practically and logically considered together, since close canalicular connexions are present in the male. The importance of the two-glass test in diagnosis has already been referred to.

Symptoms of inflammation of the posterior portion of the urethra are practically those of cystitis, and this applies to inflammation of any part of the female urethra.

Before the patient urinates, or before a catheter is passed in the female, the urethra should be milked to exclude the presence of a purulent discharge.

Inflammation of the prostate gland occurs in all grades of severity. In very acute prostatitis and in prostatic suppuration fever and malaise are present, and referred pains may occur in the perineum or lower part of the back or sacrum; the patient may actually localize his pain to the anal canal, just about the position of the gland itself. Referred pains also occur in chronic prostatitis, and they may be situated in any part supplied by the sacral nerves. Various sexual and general neurasthenic disturbances may also accompany chronic prostatitis.

Infection of the seminal vesicles often accompanies prostatitis, and the ejaculatory ducts usually participate in the inflammation, leading sometimes to painful or blood-stained seminal ejaculations. Drainage may be very poor from infected seminal vesicles, with consequent absorption and occasional complications in the joints and the eyes. Pain from inflamed seminal vesicles may be referred to the perineum or sacrum, but may simulate renal colic; in some cases actual ureteric obstruction occurs from pressure on the lower part of the ureter.

Inflammation of the epididymis and *ductus deferens* is obvious, since these parts are superficial; occasionally one is misled by iliac radiation of pain from an epididymitis, and an appendiceal or ureteric inflammation is considered; examination of the male external genitals should always accompany routine abdominal examination.

Treatment.

Relief of Obstruction.

If obstruction, organic or spasmodic, is present, it must be relieved. This is done in various ways, according to the actual conditions.

The external meatus may need meatotomy in the male, and dilatation with metal sounds in the female; a stenosed or even relatively narrow meatus

is a frequent cause of urinary tract infection in both sexes.

For strictures of the urethra one should keep at hand several fine silk bougies, say 3, 4 and 5 French, while for prostatic and other bladder neck obstructions, olivary tipped *coudé* rubber catheters of size 7, 8 and 9 English are the best. Through the largest of these a metal prostatic stylette will pass and may be found useful if the middle lobe of the prostate is so developed that only a boldly curved firm catheter will ride over it.

When a filiform bougie is passed through a stricture it may be left in for twelve to twenty-four hours; urine will dribble away beside it. After removing it, a little belladonna will relieve spasm and aid natural micturition. Increasing sizes of bougies applied once a week thereafter will continue the treatment.

When a catheter is passed through an obstruction at the bladder neck, it should be left in place for two or three days, removed, boiled and reinserted. This is much better than the customary practice of visiting the patient twice a day to perform intermittent catheterization; only by continuous drainage is infection relieved and renal failure ameliorated.

Obstruction of the ureter should be relieved by cystoscopy and ureteric catheterization. Ureteric catheters may be left in position for several days at a time, particularly in the treatment of the pyelitis of pregnancy. In performing dilatation of the ureter to relieve stricture or to facilitate the descent of ureteric calculi, twenty-four hours is sufficient length of application.

Local Antisepsis.

When a urethral or ureteric catheter is left *in situ*, the drainage achieved thereby is all-important. Nevertheless local lavage by antiseptic lotions will hasten removal of the infection. For general routine use oxycyanide of mercury is the best antiseptic and is used in strengths varying from 1 in 16,000 to 1 in 4,000. A stock solution of oxycyanide of mercury, 1%, should be kept at hand; half an ounce of this solution in a pint of water makes a 1 in 4,000 solution. In irrigating the bladder this viscus should be partly or wholly filled, but never distended, and the fluid allowed to run off. Two to three pints of lotion are used. After-irritation should be avoided.

In order to reinforce the antiseptic effect, half to one ounce of mercurochrome, 0·25% to 1·0%, should be instilled after the oxycyanide of mercury cleansing.

With renal pelvis lavage only three to five cubic centimetres of oxycyanide lotion are injected, and this is repeated ten to twenty times, after which a similar amount of mercurochrome solution is instilled. In chronic renal infections silver nitrate instillations, 0·5% to 1·0%, are generally preferred; a suitable amount of this solution is instilled as a rule just before the ureteric catheter is withdrawn. When the ureteric catheter is to be left in position the mercurial lotions are more suitable. Should previous pyelography have disclosed a larger pelvicalycine content than the usual four to seven cubic centimetres, correspondingly larger amounts may be injected each time.

Oral Route Antisepsis.

The time-honoured oral method of antisepsis is undoubtedly helpful in many cases. Still it should be remembered that antisepsis by this route is often of little use; indeed, not only is the concentration of antiseptic in the urine too feeble as a rule, but gastro-intestinal upset is of frequent occurrence; particularly does the latter occur with hexylresorcinol and pyridium.

By mouth medicaments are used mainly for two purposes: (i) to effect antisepsis, or at least bacteriostasis, and (ii) to alter the reaction of the urine.

Alteration of the urine reaction in the direction of alkalinity is most useful in acute inflammatory conditions; in these circumstances the urine is generally found to be strongly, or at least moderately, acid, whether in colon bacillary or coccal infections. Two to four cubic centimetres (half to one drachm) of potassium citrate are given in a mixture with about 0·6 cubic centimetre (ten minims) of tincture of belladonna every four hours. Further alkalinization is best achieved by diet, to be described shortly. As a sedative measure, in addition, one should give 0·03 gramme (half a grain) of methylene blue and 0·24 cubic centimetre (four minims) of sandal-wood oil in a capsule after each meal.

Acidification of the urine finds its most useful application in more chronic infections associated with ammoniacal decomposition of the urine, including particularly post-operative drainage of the bladder. Diet may be used to further acidification, and this will be dealt with shortly. Many drugs have been tried to secure acidification, and the latest favourite among urologists is ammonium chloride in capsules. I generally commence with 0·42 gramme (seven grains) after each meal, increasing very gradually until two or even three such capsules are taken after each meal. By this method the usual gastric intolerance is avoided.

Hexamine retains its place as one of the most useful urinary antiseptics, but the urine should be rendered acid before it is prescribed. The acidifying agent should not be prescribed in the same mixture as the hexamine. This drug should be given between meals to avoid periods of greatest acid content in the stomach. By observing these precautions the drug will retain most of its integrity until it first reaches an acid medium in the renal tubules. To secure continuity of action hexamine should be taken at 6 a.m., 11 a.m., 4 p.m. and 9 p.m., about 0·72 gramme (twelve grains) in each dose, with 2·0 cubic centimetres (half a drachm) of tincture of hyoscyamus. To mitigate irritant action from the formalin split off from hexamine, one should prescribe after each meal the capsules of methylene blue and *oleum santali* mentioned above.

Pyridium (or "Neotropin") in 0·1 gramme (one-and a half grain) tablets should be given in cases in which the urine cannot be rendered acid or when hexamine is too irritating, as in most acute conditions. Pyridium is supposed to exert its antiseptic effect whatever the urine reaction. The dose should be gradually increased from one tablet after each meal until six tablets a day are being taken; this is provided gastric upset is not caused.

Intravenous Route Antisepsis.

Since far more effective concentration of an antiseptic agent in the urine, without accompanying gastric upset, is obtainable by intravenous administration, it is vastly superior to the oral route, though not so convenient.

Practitioners should take up this method as a routine procedure, and very little trouble will be experienced provided a fine needle with a perfect point is always used. Elastic pressure by cotton wool swab and bandage should be applied immediately after the injection; in this way, even if the patient shows only one good vein, it can be preserved for many punctures.

Hexamine is now available as a camphorate, in 40% solution in ampoules for intravenous injection. This preparation is called "Amphotropin" by the firm Bayer. A twenty cubic centimetre ampoule contains eight grammes of the antiseptic. The camphoric acid is said to act as a sedative to the urinary tract mucosa and also as a urine acidifier. I have found tolerance by the mucosa to be very good, and larger doses of hexamine can be given than by any other method I know of. As a rule one begins with twenty cubic centimetres and repeats the dose every two to three days, according to tolerance; according to tolerance also, the dose may be increased to 30, 40 or even 60 cubic centimetres.

Hexamine acts only while being carried in the urinary stream. If one desires to act antiseptically on the renal cortex, the prostatic parenchyma, the seminal vesicles, the perinephric, periureteral, perivesical or periurethral tissues, a general circulatory antiseptic is necessary. For this use perhaps the most valuable substance we possess is mercurochrome. Mercurochrome is the combination of a dye radicle with mercury, the dye radicle being excreted in great part by the urine, carrying with it the combined mercury, so that urinary as well as circulatory antisepsis is favoured by the use of mercurochrome.

Hugh Young's original aspiration to achieve a *"therapia sterilisans magna"* by means of large doses (25 to 35 cubic centimetres) of a 1% solution given intravenously has been departed from in great measure by Young himself. Reactions were too severe with the above doses, but it has been found that smaller doses are well tolerated, yet achieve a considerable success.

Mercurochrome is less toxic if given in combination with glucose (1% mercurochrome in 5% glucose). If the patient is in hospital, larger doses may be given, but even in one's rooms it is safe to commence with 8 to 12 cubic centimetres, according to the sex and the general condition of the patient. Estimations of the patient's weight are entirely unnecessary. The injection is repeated every two to three days, and the dose is increased by one to three cubic centimetres on each occasion, according to tolerance. One commonly advances to 16 or even 20 cubic centimetres, but hardly ever beyond this.

In two to four hours after the injection the temperature rises and the patient may feel feverish or even experience a rigor or severe headache. He quickly recovers from this. I have only rarely seen diarrhœa, and hardly ever gingivitis. Usually I give four injections in eight to ten days, then a week's rest, repeating the course thereafter as considered necessary.

Gentian violet or crystal violet given intravenously is declared by some workers to be a specific for staphylococcus infections. I have not yet put this dye into routine use and so cannot speak about it.

"Novarsenobenzol" is also specific in its action against staphylococci, and should be given in doses of 0·45 gramme intravenously, twice in one week, alternating with a course of three mercurochrome injections during the previous week. After a fortnight's rest a similar course of three mercurochrome injections followed by two injections of "Novarsenobenzol" is given. Further treatment along these lines may be pursued as indicated by the progress of the case.

Colon bacillary infections are more difficult to cure than coccal, so while the urinary tract is being attacked by the intravenous route, intestinal antisepsis should be attempted by the oral route and by colonic lavage, "Dimol 43" tablets being given by mouth, two before each meal, and "Dimol" lavage powder, four to eight cubic centimetres (one to two drachms) in 600 cubic centimetres (a pint) of hot water, as a colonic lavage once a day.

Surgical Measures.

Though perinephritis may sometimes be successfully combated by mercurochrome given intravenously, perinephric suppuration calls for surgical drainage. Similarly, though acute pyelonephritis, even if accompanied by high fever, chills and prostration, may be favourably affected by intravenously administered mercurochrome, a fulminating renal infection, if unilateral, usually demands urgent nephrectomy.

Operation may be necessary to remove a calculus obstructing any portion of the urinary tract, obstructions such as those due to an aberrant vessel or adhesions deforming the ureter, and a host of other forms of obstruction in the upper and lower portions of the urinary tract, the commonest of all being the obstructions due to adenoma of the prostate and stricture of the urethra. Drainage of infected portions, as well as removal of the actual obstruction, is often indicated, such as the

commonly employed suprapubic drainage of the bladder before removal of a prostatic obstruction.

Dietetic Measures.

In obstinate colon bacillary infections the ketogenic diet has been much discussed and tried. To be of value it must reduce the pH of the urine to as near to 5 as possible and keep it continuously in this very acid condition for some weeks. There are many practical difficulties in consequence, the chief of them being the great trouble patients experience in tolerating the diet for a sufficient period for it to be effective.

In acute infections, when the urine is acid, an alkalinizing diet is used. This, shortly, speaking, is a lacto-fructo-vegetarian diet. Vichy water may advantageously be mixed with the milk. Citrus fruits and the drinks made from them are also very helpful.

When acidification of the urine is required, milk, fruit and vegetables should be reduced temporarily, though not completely eliminated. Nitrogenous foods are allowed and even encouraged.

Autogenous Vaccines.

Autogenous vaccines may be employed in any urinary tract infection, but where obstruction of any kind exists it should be removed and antisepsis should be attempted by the above-described methods. Autogenous vaccines may then enter the field as adjuvants to the other methods, and also as agents designed to immunize the body, at least partly, against future attacks of the offending germs. This particularly applies to chronic relapsing types of colon bacillary infections when no definite organic changes can be determined by pyelography *et cetera*. Autogenous vaccines may be used almost from the beginning in non-obstructive cases of infection. Acute and subacute stages of inflammation should be allowed to subside before vaccine courses are started.

ANÆMIA IN CHILDHOOD.[1]

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IF today one passes under the benevolent figure of King Henry VIII which surmounts the portals of Saint Bartholomew's Hospital, one enters a hospital the history of which dates back to the year A.D. 1123. During those eight hundred years many great men have striven here to conquer the problems of medicine, but no man has rendered a greater service than William Harvey, who was appointed to the staff in the year 1609. It was Harvey who first described the circulation of the blood and its component parts, and it is to his genius that we must pay homage when discussing the various disorders which lead to the production of anæmia.

In recent years great advances have been made in the study of anæmia, and in this paper it will suffice to consider but a few of the anæmias of childhood which are of special clinical interest. Some rare conditions have been included, but only to emphasize the widespread distribution of anæmia. How often does the primary diagnosis completely occupy the mind, and the presence of pallor serve merely as a link to aid in the diagnosis, instead of being viewed as a serious disorder demanding recognition and treatment.

Ætiology.

The bone marrow occupies the position of prime importance in the formation of normal red blood corpuscles, and anæmia may conveniently be divided into two main groups:

Group A (deficiency anæmia), in which there is a shortage of supplies to the bone marrow, especially of iron, copper, vitamin *B*, vitamin *C*, thyreoid secretion, oxygen or the anti-pernicious anæmia factor.

Group B (anæmia caused by inhibition or destruction of the bone marrow or circulating red cells). The chief noxious agents in this group are toxins or an over-action of the spleen or other portions of the reticulo-endothelial system. In addition it is essential to realize that more than one factor may be at work in the production of anæmia, so many mixed types are seen. This is of great importance when a plan for treatment is being evolved.

Group A: Deficiency Anæmia.

The bone marrow obtains most of its supplies by way of the alimentary canal, and in childhood iron is the most important material to consider.

Iron is richly distributed in liver, egg yolk, spinach, and to a less extent in prunes, wheat and bananas.[(1)] At the other extreme, both human and cow's milk contains but a trace. Nature has thus provided a diet deficient in iron for the first six or nine months of life, a time when the demands are relatively great, owing to the rapidity of bodily growth. In order to combat this deficiency, the new-born baby is endowed with a rich store of iron in the liver, which has been acquired from the maternal circulation during the last few months of fœtal life. For the first six or nine months after birth this supply fully compensates for the deficiency of iron in the milk, but if milk feeding is prolonged or if the baby is premature, with poor iron stores, an iron deficiency will slowly develop. The anæmia is of the hypochromic microcytic type, the hæmoglobin being diminished out of all proportion to the fall in the red cell count (low colour index). The red cells vary in size and tend to be small and poorly filled with hæmoglobin, ring forms being abundant.

Many conditions of clinical interest may result in older children being fed on a fluid diet consisting

[1] From a paper read at a meeting of the Victorian Branch of the British Medical Association on April 3, 1935.

mostly of milk. The child with a cleft palate is fed on a fluid diet, owing to his deformity, and the resulting anæmia may pass unnoticed, thus preparing the soil for those post-operative infections which are the dread of the surgeon.[1] The mentally deficient child refuses to masticate solid food. The highly strung solitary child of wealthy parents may claim attention by his determination to refuse all solids.

Vomiting.—Chronic vomiting results in a depleted iron intake. Rare conditions, such as diaphragmatic hernia and cardiospasm, may thus be accompanied by anæmia, and several such cases have been seen by the writer in which anæmia was the first diagnosis to be made.

Gastric Acidity.—The acid in the gastric secretion aids in the absorption of iron from the alimentary canal. It is several years now since Witts[2] described an iron deficiency anæmia in adults which was associated with an absence of free hydrochloric acid in the stomach. Recently Hawksley, Lightwood and Bailey[3] have described a similar condition in childhood. These children develop an iron deficiency anæmia, in spite of the fact that they are fed on a well balanced diet containing sufficient iron to prevent anæmia in a normal subject. The anæmia responds to large doses of iron, but usually the gastric acidity does not return.

Treatment of Iron Deficiency Anæmia.—Iron and ammonium citrate is a satisfactory iron preparation. Doses of one grain per pound body weight per day may be given in divided doses during the first two years of life, and relatively large doses to older children. During the first few days of treatment very small amounts should be administered, otherwise gastro-intestinal disorders may result. It is doubtful if liver feeding plays any part in the treatment of the anæmias of childhood apart from its high iron content.

Intestinal Absorption.—Impaired absorption of the intestinal contents may lead to a deficiency anæmia. The ætiology of cœliac disease is unknown, but it is probable that all the symptoms can be explained by a deficiency in intestinal absorption. A lack of iron, vitamin *B* or vitamin *C* may contribute to the anæmia. Although iron is the commonest defaulter, many cases are on record in which vitamin *B* deficiency predominates, the anæmia being macrocytic in type and responding to large doses of marmite.[4]

Scurvy.—Children with scurvy are anæmic for several reasons. Their diet may be lacking in iron and vitamin *B* as well as in vitamin *C*; the repeated small hæmorrhages produce a drain on the iron stores, the appetite is poor, and finally vitamin *C* may be an essential factor in the production of red blood cells.[4] Vitamin *C* in the form of orange juice usually cures the anæmia, but iron may have to be included.

Endocrine Glands. In addition to the various materials which are obtained by way of the alimentary canal, the bone marrow is influenced by the internal secretions of the body. In cretinism, in which the thyreoid gland is deficient, anæmia is usually encountered. Thyreoid secretion is probably necessary for the formation of red blood cells,[4] but in cretinism other factors may be at work. Prolonged milk feeding is given owing to the physical retardation, the volume of milk taken at each feeding is small owing to physical inertia, and the greatly enlarged tongue is a mechanical interference with the act of sucking. If these children are closely observed, it will be seen that a considerable proportion of the milk escapes from the corner of the mouth.

Group B: Anæmia due to Inhibition or Destruction of the Red Cells either in the Bone Marrow or the Peripheral Circulation.

When the baby is born there is a fall in the red cell count from six and a half to under five million cells per cubic millimetre, due to the change in the oxygen tension and to other influences which are at present unknown. This fall is often associated with a mild hæmolytic jaundice which appears a few days after birth and which lasts but a short time. There is no associated toxæmia and no treatment is required. This has been suitably called *icterus simplex neonatorum*. On rare occasions severe and prolonged hæmolysis may occur, either before birth, soon after birth or even after the child is several months old. The underlying cause of this destructive process remains a mystery, but its results have been carefully investigated by several workers,[5][6] and what have previously been considered to be three separate diseases of the new-born infant have now been grouped together as one disease, the hæmolytic anæmia of the new-born. The hæmolysis results in anæmia (*anæmia gravis neonatorum*), jaundice (*icterus gravis neonatorum*) and œdema (*hydrops fœtalis*). In addition there is a tendency to hæmorrhage. If jaundice is present, it may be intense and associated with toxæmia, and the yellow coloration of the skin may mask the anæmia. The blood picture is typical of a hæmolytic anæmia. There are signs of hæmolysis, as shown by a low red cell count, jaundice and an increase of the blood pigments in the urine and fæces. The accompanying evidence of blood regeneration is shown by the great number of nucleated red cells (normal number at birth is 1,000 to 2,000 per cubic millimetre[6]) and reticulocytes in the peripheral circulation. In addition, Parsons and his fellow workers[5] have drawn attention to the widespread nature of the blood regeneration which takes place in these infants. During fœtal life the production of red cells takes place not only in the bone marrow, but also in the liver, spleen, lymph glands and other parts of the body. This extramedullary erythropoiesis normally ceases when the baby is born. When, however, there is an urgent call for increased blood production, the new-born baby may retain or revert to this fœtal state. Small nests of developing red cells may thus be seen scattered throughout the liver substance.[6]

Should a new-born baby develop a hæmolytic anæmia as displayed clinically by severe and prolonged jaundice, pallor or œdema, the physician should view the problem with concern and should make a hæmatological examination. The fact that the condition has a familial tendency may aid in making the diagnosis.

The treatment of the hæmolytic anæmia of the new-born has received much attention during recent years, and now most authorities agree that blood transfusion saves the greater number of lives. It should be emphasized that about 20% of patients[6] will recover even if no treatment is given, and results must not be assessed on a small number of cases. The consensus of opinion is that the intramuscular injection of blood or any of its constituents is of very doubtful use, and may do harm by deferring the more effective form of treatment. The writer agrees with Hawksley and Lightwood,[6] who recommend repeated blood transfusions as the best method of treatment. They advocate the giving of about half an ounce of citrated blood per pound body weight. This is repeated every four to seven days until the red cells reach 4,000,000 per cubic millimetre. Further, they emphasize the danger of admitting these infants to a hospital ward, owing to their susceptibility to cross-infection. The baby is admitted to hospital for twenty-four hours only, when a complete blood examination is made and the first blood transfusion is given. The subsequent transfusions are performed in the out-patient department.

In older children hæmolytic anæmias of unknown ætiology occur and they receive different names according to the age of the child and the acuteness of the symptoms. Examples of these are the hæmolytic anæmias of von Jaksch, von Lederer and Cooley.[7] In the main the blood changes and the treatment are similar to those of the neonatal variety.

Besides these anæmias of unknown ætiology, it is common to encounter mild or even severe grades of anæmia associated with toxæmia of either bacterial or biochemical origin. The child with lobar pneumonia may develop an empyema and the toxæmia is prolonged. He becomes very pale and the low hæmoglobin content of the blood weakens the resistance of the body. At the Hospital for Sick Children, Great Ormond Street, London, Dennis Brown has pointed out the benefits derived from a blood transfusion given prior to operation for empyema. Acute diseases, such as pyelitis, may be accompanied by a surprising fall in the hæmoglobin. This will tend to be spontaneously restored to normal when the infection is controlled.

Chronic nephritis with nitrogen retention and widespread toxæmia may produce alarming changes in the growing child. Ellis and Evans[8] have surveyed the cases of renal dwarfism (rickets) at the London Hospital and have shown that in the majority of these cases there is a dilatation of the urinary tract. In six of their cases a blood examination was performed and the average hæmoglobin value was only 54%.

In conclusion it should be emphasized that anæmia is common in childhood and militates against the natural powers of resisting infection. Its cure may be simple and the benefits attained far reaching. The common causes are but few. If the anæmia be of the deficiency type, iron will usually effect a cure; if a destructive agent is at work, the source of toxæmia should be looked for and removed. Should the anæmia be severe, blood transfusion is indicated, especially in the hæmolytic group.

Summary.

1. The association of anæmia with many diseases is emphasized. Its presence and type should be recognized so that appropriate treatment may be given.

2. The ætiology of anæmia is discussed and a division is made into the deficiency anæmias and the inhibitory or destructive group.

3. The deficiency group is described, with special reference to the supply and metabolism of iron.

4. In the inhibitory or destructive group the anæmias of the new-born are described and their treatment by blood transfusion is advocated.

References.

(1) I. J. Wood: "Some Cases of Anæmia in Infancy", *Saint Bartholomew's Hospital Reports*, Volume XLVII, 1934, page 89.
(2) L. J. Witts: "Chronic Microcytic Anæmia", *The British Medical Journal*, Volume II, 1931, page 883.
(3) J. C. Hawksley, R. Lightwood and U. M. Bailey: "Iron Deficiency Anæmia in Childhood", *Archives of Disease in Childhood*, Volume IX, 1934, page 359.
(4) L. Parsons and J. C. Hawksley: "Studies in the Anæmia of Infancy and Early Childhood", Part III, *Archives of Disease in Childhood*, Volume VIII, 1933, page 117.
(5) L. Parsons, J. C. Hawksley and R. J. Gittins: "Studies in the Anæmia of Infancy and Early Childhood", Part IV, *Archives of Disease in Childhood*, Volume VIII, 1933, page 159.
(6) J. C. Hawksley and R. Lightwood: "A Contribution to the Study of Erythroblastosis", *The Quarterly Journal of Medicine* (New Series), Volume III, 1934, page 115.
(7) L. Parsons and J. C. Hawksley: "Studies in the Anæmia of Infancy and Early Childhood", Part V, *Archives of Disease in Childhood*, Volume VIII, 1933, page 184.
(8) E. Ellis and H. Evans: "Renal Dwarfism (Rickets)", *The Quarterly Journal of Medicine* (New Series), Volume II, 1933, page 231.

Reports of Cases.

INTERSTITIAL KERATITIS, BOOMERANG LEGS AND YAWS IN A EUROPEAN BOY FROM THE NEW HEBRIDES.

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THIS case is reported as it was thought that perhaps it might throw some light upon the present uncertain association of interstitial keratitis and yaws and on the larger problem of the identity of yaws and syphilis. For the purpose of the present paper it will be assumed that these conditions are two separate diseases, as recent experimental work indicates: Pearce and Brown (1925), Nichols (1925), Reasoner (1929), Miyao (1930), Schoebl (1931).

Clinical History.

The patient was a European male, aged fourteen years. He was born at Epi, New Hebrides, and soon was taken to Ambrim, where he lived for two and a half years; the next two and a half years of his life were spent in South

Australia. Then he spent another period in the New Hebrides, six months in Epi, and two and a half years in Ambrim. He has been in South Australia for the past six years.

The history of his mother's pregnancies is as follows: The first ended in a miscarriage. From the second was born a female, now twenty-three years of age. The third pregnancy produced a male, now twenty-one years of age. The fourth produced a female, who died in South Australia, aged nine years, of complications of measles. The fifth pregnancy ended in a stillbirth "caused by severe malaria and quinine". The sixth produced a male, now fifteen years of age. The seventh pregnancy produced the patient, now fourteen years of age. The father at the time of the child's birth was aged thirty-six and the mother thirty-seven years.

The mother died having had no further pregnancies. No medical man was in attendance at the mother's death; the father considers it was due to severe malaria. For some time she had suffered from high fever (40° C. or 104° F.), which quinine given intramuscularly and phenacetin did not relieve, and she died from exhaustion.

All members of the family suffered frequently from malaria while in the islands.

When confronted with the possibly syphilitic nature of his son's eye condition the only suspicious incident that his father could recall was an abscess on his cheek, which he had associated with shaving immediately after opening an abscess on a native, antiseptic facilities not being available. This occurred before he was married, and the doctor who incised the abscess, associated it with the condition he had treated in the native. He has had no rash, and apart from frequent attacks of fever has had good health. He and his sons have been engaged in mixed farming for the last six years.

There is nothing suggestive in the medical history of the other children, who, on casual observation, appear healthy, well nourished and developed. By a second marriage there have been two children (no miscarriages), who are also in excellent health.

The patient's father associated the deformity of his legs with an abscess which the patient developed on the back of his right thigh, just above the middle third. This was observed seven years ago (1928) while they were staying for a week on the island of Paama. An abscess of moderate size situated deeply in the muscles was observed one day; next day it had become soft and resolved shortly after without incision.

When he came to Australia the next year (1929) his shins were already deformed. This deformity increased during the next few months and was associated with rheumaticky pains in the shins and forearms (no joint pains). The patient cannot recollect the onset of the leg condition and does not think he had any pain earlier. He still has occasional pains, especially in the lower third of the forearms. During the last year he has developed a lump the size of a small pea on the back of his left hand, just above his wrist; it is not tender.

In November, 1933, his left eye became inflamed and he was admitted to the Adelaide Hospital in December, complaining of progressive loss of vision in his right eye and intolerance to light. The left eye had given no trouble.

He was a well-nourished lad of average height for his age, but a little pale.

No pathological condition was found in his head and neck, except for the condition of his eyes. There was considerable blepharospasm of the lids of the right eye—some swelling of the lids and a lot of ciliary injection. The tension was full and the cornea hazy, with a more pronounced interstitial milkiness in the centre. The pupil was semi-dilated and fixed, with intense swelling and vascularization of the iris. There was a small hypopyon present. No break in the corneal epithelium could be detected.

No abnormality was detected in his thoracic or abdominal organs or central nervous system. His urine was normal.

His lower forearms appeared rather thick, but were not suggestive of any diseased condition. On the back of the right wrist was found the mass referred to in the anamnesis. It was three to four millimetres in diameter and appeared to lie in the deep subcutaneous tissue and to be but loosely attached to the fibrous tissues over the tendons.

Both tibiæ showed swelling anteriorly (with the maximum point just above the middle of each bone), which gave the impression of forward bowing. There was slight lateral swelling. The anterior tibial crest was rounded. There was no involvement of the soft tissues and no evidence that this had occurred in the past. The whole change appeared of a diffuse character and no tenderness was detected. The tibiæ appeared to be of increased antero-posterior diameter in their middle third.

The radiographs of his tibia showed some forward bowing with increase in antero-posterior diameter. There was evidence of some trabeculation in the medullary cavity along the anterior cortex. No lines of arrested growth were present. The radiologist's report was: "suggestive of specific periostitis".

On the skin about both ankles were several oval scars, roughly one to two centimetres in length. The surface was whiter than the surrounding skin and slightly below the level of the normal skin. These, he said, were the result of sores from which he had suffered in the New Hebrides—in fact, all the white children there suffered from them. His brothers had similar scars.

The patient gave a positive reaction to the Wassermann test on December 15, 1933; the father and two brothers, who were tested on December 22, 1933, gave no reaction.

The scars on the legs can be regarded as a guide in differential diagnosis, as none of the boys has had any specific therapy, and they were present on his brothers' legs, although his brothers' serum did not react to the Wassermann test.

The patient's father was told by a doctor who was practising on the islands mentioned above, that there was no syphilis among the natives, but that yaws was very common. This is in agreement with the reports from other Pacific islands, where yaws is common among the inhabitants and syphilis practically unknown. His father said bent shins were common amongst the natives.

Within a month from the patient's admission to hospital the left eye commenced to lachrymate and become reddened. The right eye improved, but the left showed signs of acute iritis and corneal haziness. Later both eyes improved and at the end of the second month he could tolerate daylight with dark glasses, but a divergent strabismus of the right eye was present. The cornea cleared and many keratitic precipitates were seen in the right eye. During this time he was given twelve weekly injections of "Novarsenobenzol", 0·45 gramme, followed by mercurial inunctions and a potassium iodide mixture for two weeks. The Wassermann reaction was positive on January 19, 1934. He was discharged from hospital in March, but was readmitted in April and May with episcleritis of the left and right eyes respectively. In May the vision of his right eye was $^{6}/_{36}$ and of his left $^{6}/_{12}$, and both eyes were practically white.

He was readmitted to hospital in March, 1935, for investigation. He was well and his eyes were satisfactory. He had developed a nodule on his left wrist. The serum was weakly Wassermann positive on March 22. On the same date cerebro-spinal fluid failed to give a Wassermann reaction and on examination was found to contain only an occasional lymphocyte in films. He was given seven more injections of "Novarsenobenzol", 0·45 gramme, and serum collected on May 9 was found not to react to the Wassermann test. During his stay in hospital the strabismus in his right eye was corrected. At this time the nodules on his wrists were subsiding and he was feeling very well. The vision of his right eye was $^{6}/_{24}$ and of his left eye $^{6}/_{12}$.

References to the Literature on Interstitial Keratitis and Sabre-Tibiæ and Yaws.

Hunt and Johnson (1923), writing of Samoa, where they say syphilis does not exist among the natives, report that they have studied a condition which is identical with parenchymatous or interstitial keratitis.

Blacklock (1930), who holds the view that yaws and syphilis are one disease, in a report on Sierra Leone, Northern Province, records (page 11) ten cases of interstitial keratitis. He postpones the section on syphilis "for a future report". In the Central and Southern Provinces he makes no mention of interstitial keratitis in the table dealing with eye diseases. Discussing congenital syphilis (page 29), he observed one case of Hutchinson's teeth in 3,858 patients examined, and treats of sabre-tibiæ as a manifestation and indication of congenital syphilis. He found 38 cases of sabre-tibia in 3,595 patients examined. On page 37 he gives a table (VIII) in which he shows that of these 38 patients with sabre-tibia, three had yaws and 31 gave a history of yaws. Many observers have reported the association of yaws with sabre-tibiæ and bone pains: Bahr (1914), Clapier (1920), Wilson and Mathis (1930), Spittel (1923), Botreau-Roussel (1925), Hermans (1928), Manson-Bahr (1929), Montel and Couput (1923).

The association of interstitial keratitis and yaws is less definite.

Hashiguchi (1929) reports the occurrence of interstitial keratitis in rabbits inoculated with yaws.

Wilson and Mathis (1930), in a study of 1,423 cases of yaws in Haiti, report four cases of interstitial keratitis.

Knott (1931) speaks of interstitial keratitis as a yaws condition in Liberia.

Fast (1931), in a review of the literature, found references to interstitial keratitis in yaws.

Takasaki (1932), writing of Truc and Palau, Caroline Islands, speaks of "parenchymatous conjunctivitis, keratitis and iritis" in yaws.

Harley (1933), in a study of 6,291 cases seen in North Liberia, reports 38 cases of interstitial keratitis. Although he speaks of most of his cases as being yaws, he says "there may also be an occasional case of syphilis".

A case in some respects similar to the present one was reported by Gardner (1895).

A male, aged sixteen years, from Meiteum, New Hebrides, had suffered ill-health since six years of age. He had had ague and also bone disease, with sores on arms and legs, and had been in hospital in Sydney in 1888, when the sores nearly healed. He was thin and sallow. He had a "remarkable deformity of both tibiæ, especially of the left, the bone being thickened, flattened laterally and bent forward, so that it is shaped somewhat like a boomerang. . Scars of old sores, one sore still unhealed on the left ankle. Some swelling and deformity of the left radius and ulna, with periosteal nodes. Liver and spleen very much enlarged." There were enlarged and tender parts on humerus and metacarpal bones. The medulla of the long bones was freely drained at operations, when the bone was found to be sclerosed in parts, while in other parts the compact tissue appeared to be very thin. Considerable improvement followed. The pathological report was: "Evidence of ostitis, but no microorganisms were found."

He quotes a letter from Dr. Paton, the missionary, to the effect that the disease existed in all the southern islands of the New Hebrides. White children on Aneiteum, Aniwa and Nguna had been attacked by it. Five patients were children of missionaries and one was of a trader. Parents were all healthy. In all, from 28% to 30% of the inhabitants (presumably referring to natives) suffered from it. After the children began to walk and as they grew heavier, the disease developed, with swelling and deformity of the bones of the legs and forearms, and finally progressed to ulceration of the skin over the most prominent part of the anterior curvature of the leg. Children who had been removed from the islands when young had in some cases developed the disease years later. It always caused much pain similar to that from inflammation.

Gardner writes: "Apparently the patient suffers first from periostitis and later from an ostitis", and he goes on to discuss platycnemism. He arrived at no diagnosis, but it may be safely suggested that this was a case of yaws and the signs of activity of the disease would have responded readily to modern arsenicals.

A thesis is at present being prepared dealing with the association of "boomerang leg" and yaws, where certain points briefly referred to above are dealt with more fully.

Conclusion.

With the conditions present in this case, interstitial keratitis and sabre-tibiæ in a youth, the obvious diagnosis would be congenital syphilis. There is then to be disposed of the absence of Wassermann reactions in his father and two elder brothers. The two accidents in his mother's history—the initial miscarriage and the later stillbirth—cannot be considered any definite indication. Miscarriage of the first pregnancy is common in healthy European women in all countries, and accidents in pregnancy are common in malarial countries.

Mr. A. S. Webb, who was for some years in Aoba, New Hebrides, says that one of the means (practised by the natives) of foretelling the progress of the early years in life of a new-born child, was to observe the effect on the placenta of throwing it upon glowing coals. The forecast depended on whether or not the placenta shrivelled up before it charred. No references to the effect of such treatment on placentæ, controlled by microscopical examination for the presence of malarial parasites, have been found; but in West Africa malarial surveys have been attempted by using the percentage of infected placentæ as an index.

If the two conditions present are considered separately, there is the interstitial keratitis which is generally understood to be a manifestation of congenital syphilis, and the sabre-tibiæ, commencing in early adolescence in an individual from a locality where yaws is endemic and where sabre-tibiæ occur. Taking Gardner's case into account, the leg deformity would be considered more probably yaws than syphilitic in origin. There is considerable evidence to show that some cross-immunity exists between yaws and syphilis (Reasoner, 1929, Schoebl, 1931). It would be improbable that a congenital syphilitic infection which produced interstitial keratitis would allow of a concurrent infection of yaws.

Hence both conditions must be due to the same cause, either syphilis or yaws. Cases of double infection with these two diseases have been reported, but they are not frequent and all are not satisfactory. The evidence for a congenital syphilitic infection is not convincing. The patient is the last child of the mother, previous children are healthy, and his elder brothers and father do not give Wassermann serum reactions, he alone having a positive reaction. It is difficult to ascertain the part played by the abscess in his thigh; perhaps it further lowered his resistance and allowed an earlier infection to become active. With the present difficulty of differentiating syphilis from yaws, it is perhaps permissible to cast considerable doubt on a congenital syphilitic origin for the conditions present in this case and to suggest that more probably yaws was the causal factor, especially in view of the relatively rapid change in the response to the Wassermann test brought about by the administration of "Novarsenobenzol".

Acknowledgements.

The patient was under the care of Dr. A. L. Tostevin, and I am indebted to him for giving me access to it and for the clinical notes. I am also indebted to Dr. J. G. Sleeman, Superintendent of the Adelaide Hospital, for permission to publish this report.

Bibliography.

P. Bahr: "Notes on Yaws in Ceylon, with Special Reference to its Distribution in that Island and its Tertiary Manifestations", *Annals of Tropical Medicine and Parasitology*, Volume VIII, 1914, page 675.

D. B. Blacklock: "Report on Survey of Human Diseases in the Protectorate of Sierra Leone", Volume XI, 1930, page 29.

Botreau-Roussel: *"Ostéites pianiques goundou", Collection de la Société de Pathologie Exotique, Monographie* I, 1925.

Clapier: *"Ostéite hypertrophique au cours du pian", Bulletin de la Société de Pathologie Exotique*, Volume XIII, 1920, page 315.

G. Fast: *"Oorziekten bij Framboesia tropica naar aanleiding van een geval van neuroretinitis"*, *Geneeskundig tijdschrift voor Nederlandsch-Indië*, Volume LXXI, 1931, page 361. (Quoted in *Tropical Diseases Bulletin.*)
W. Gardner: "Platycnemism", *Intercolonial Quarterly Journal of Medicine and Surgery*, Volume II, 1895, page 47.
G. W. Harley: "Ganta Dispensary Patients: A Statistical Study of 6,291 Consecutive Out-Patients in North-East Liberia", *American Journal of Tropical Medicine*, Volume XIII, 1933, page 67.
M. Hashikuchi: "Metastatic Lesion in Rabbit Framboesia, with Special Reference to Keratitis Parenchymatosa", *Bull. Soc. Japan de Syph.*, Volume IV, October, 1929, page 1. (Quoted in *Tropical Diseases Bulletin.*)
Hermans: "Frambœsia Tropica", 1928.
D. Hunt and A. L. Johnson: "Yaws: A Study Based on Over 2,000 Cases Treated in American Samoa", *United States Naval Medical Bulletin*, Volume XVIII, 1923, page 599.
J. Knott: "Yaws in Liberia", *Porto Rico Journal of Public Health and Tropical Medicine*, Volume VI, 1931, page 385.
P. Manson-Bahr: "Manson's Tropical Diseases", Ninth Edition, 1929, page 498.
R. Montel and A. Couput: *"Lésions ostéo-périostiques tertiaires dans le pian. Aspect radiologique"*, *Bulletin de la Société de Pathologie Exotique*, Volume XXV, 1932, page 1032.
I. Miyao: "Is Framboesia Tropica a Nosologic Entity?" *Philippine Journal of Science*, Volume XLIII, 1930, page 433.
H. J. Nichols: "Experimental Immunity in Syphilis and Yaws", *American Journal of Tropical Medicine*, Volume V, 1925, page 429.
L. Pearce and W. H. Brown: "Distinctive Characteristics of Infection produced by Treponema Pertenue in the Rabbit", *Journal of Experimental Medicine*, Volume XVI, 1929, page 673.
M. A. Reasoner: "Experimental Yaws and Syphilis", *American Journal of Tropical Medicine*, Volume IX, 1929, page 413.
O. Schoebl: "Coexistent Infection with Yaws and Syphilis", *Philippine Journal of Science*, Volume XLVI, 1931, page 177.
Spittel: "Frambesia Tropica", 1932.
S. Takasaki: *"Zur Klinik der Frambösie im Kindesalter"*, *Jahrbuch für Kinderheilkunde*, Volume CXXXIV, 1932, page 169. (Quoted in *Tropical Diseases Bulletin.*)
P. W. Wilson and M. S. Mathis: "Epidemiology and Pathology of Yaws: A Report Based on a Study of 1,423 Consecutive Cases in Haiti", 1930.

Reviews.

EXPERIMENTAL EMBRYOLOGY.

IN "The Elements of Experimental Embryology"[1] J. S. Huxley and G. R. de Beer clearly state the limit they have set themselves, namely, the early period of development or what Wilhelm Roux called the "prefunctional period"; further, within this period they have almost limited themselves to the results of experimental work on the problem of the biology of differentiation, and have largely excluded the physiological aspects, such as the physiology of fertilization, the mechanics of cleavage, and biochemistry of the egg and embryo.

After a brief historical survey of the progress in philosophical outlook upon the subject, the authors have taken the development of the amphibia and given a brief *résumé* of the analytical and experimental work upon amphibian development. The second and third chapters form a skeleton framework, as it were, from which general problems are approached. At the same time the experimental methods which have been used are briefly described, for example, intravitam staining, grafting, transplantation, *et cetera*. Following on this, some general questions such as the origin of polarity, symmetry and asymmetry, and the problems involved in cleavage and differentiation are discussed.

Next the remarkable work on organizers and inducers of differentiation is very fully outlined. As is well known, we owe much of our knowledge to Spemann and his school and it is only in recent years that English observers, such as Waddington and others, have concerned themselves with these problems.

The mosaic stage of differentiation is next discussed, with its remarkable chemo-differentiation. It is believed that there is a local elaboration of specific chemical substances whereby the original lack of differentiation is replaced by an irreversible mosaic-like differentiation of the tissues, not visible by any histological means at present at our disposal. This aspect of the work is of particular interest to us, as an Australian, Dr. P. D. F. Murray, working in the Department of Zoology of the University of Sydney, was a pioneer investigator of some of these problems, more especially as regards limb differentiation. Starting under the stimulus and guidance of Huxley, he continued this work here and elaborated a new method, namely, the study of growth of pieces of chick limb bud when transplanted into the chorio-allantoic membrane of a second chick developing in a second egg. Windows had to be cut in the egg-shell and asepsis was a *sine qua non*, however difficult of attainment.

The next approach to the subject is indicated by the title of the chapter, "Fields and Gradients". The pioneer in this field, of course, is Professor Childs, of Chicago, but Huxley also has carried out much work himself. Two important chapters are devoted to work upon gradient-fields in ontogeny and post-embryonic life respectively.

The authors' concluding chapters are upon the special problems examined in the further differentiation of the amphibian nervous system, hereditary factors and differentiation, and a chapter comparing the prefunctional with functional period of development. A most interesting appendix upon exogastrulation and other work, which appeared while the book was in page proof, is added.

An alphabetical bibliography with page references to the present book completes this painstaking and remarkably complete volume. Having defined the exact scope of the work they undertook to present, the authors have given a most exhaustive survey of work done within that scope, work of entrancing interest, with its earnest of future possibilities of understanding and control of development, human or otherwise.

[1] "The Elements of Experimental Embryology", by J. S. Huxley, M.A., and G. R. de Beer, M.A., D.Sc.; 1934. Cambridge: The University Press. Demy 8vo., pp. 526, with illustrations. Price: 25s. net.

CLASSICAL EPIDEMICS.

A HANDY volume describing the occurrence and investigation of some thirty classical outbreaks of the common infectious diseases, such as that compiled by Dr. Harold Scott, under the title "Some Notable Epidemics", is sure of a welcome from health officers to whom the original accounts may be inaccessible.[1]

The examples are well arranged according to the vehicles commonly responsible for such outbreaks, namely, water, milk and food; and the comments of the author have a freshness which suggests that he has not grown old in the British public health service. His attitude, for example, towards Klein's finding that the famous Hendon scarlet fever outbreak of 1885 was due to a streptococcus actually causing disease in the cows themselves, suggests that he is unfamiliar with the subsequent trend of opinion against that view, but then Dr. Scott may do well to remind us that the possibility does nevertheless exist.

Here and there one is inclined to quarrel with the author, as when, for example, he states that normal human serum may agglutinate the Flexner organism in a dilution of one in 150 or more. Surely this is an abuse of the word normal. Moreover, it seems unnecessary nowadays, when the presence of the typhoid bacillus has been so frequently demonstrated in ordinary sewage, to suggest that the inquirer, having established that the water supply is heavily infected with sewage, needs to go further in his search for the cause of its specific infectivity.

On reading of these outbreaks the reader is reminded of the great advantages available to the health officer of today, who has at his service such assistance as that of broadcasting and of a Press eager for health news and advice, not to mention technical advances in bacteriology and methods of immunization.

It is interesting in this connexion to note that in the discussion of certain prolonged typhoid fever epidemics which have occurred in Great Britain since the War, no mention is made of the possible use of immunization as a means of checking the disease.

[1] "Some Notable Epidemics", by H. H. Scott, M.D., F.R.C.P., D.P.H., D.P.M. and H., F.R.S.E., with preface by W. W. Jameson, M.A., M.D., F.R.C.P.; 1934. London: Edward Arnold. Demy 8vo., pp. 291. Price: 12s. 6d. net.

The Medical Journal of Australia

SATURDAY, AUGUST 17, 1935.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

THE INTERNATIONAL PACIFIC HEALTH CONFERENCE.

In 1923 the plenary session of the Pan-Pacific Science Congress held at Melbourne and Sydney adopted, on the recommendation of the Sections of Hygiene and Anthropology, the following resolution:

> That the scientific problem of the Pacific which stands first in order of urgency is the preservation of the health and life of the native races by the application of the principles of the sciences of preventive medicine and anthropology.

On going into the question of its responsibilities in Papua, New Guinea and Nauru, the Commonwealth Government thought that a conference between representatives of the different countries having interests in the Pacific would give indications of directions in which action might be taken to give effect to the resolution of the congress. Not only the natives themselves were considered, but also all persons resident in the islands. It was also realized that the introduction of diseases that were non-existent in the islands might be prevented by international cooperation. The Commonwealth Government therefore asked the British Government to issue invitations to the several countries having possessions in the Pacific to send representatives to a conference in Melbourne. In 1926 the first International Pacific Health Conference was held. The Health Organization of the League of Nations sent a representative; and it subsequently showed its concern in the problems by dispatching to the island groups of the western Pacific a mission consisting of Dr. Paul Hermant and Dr. R. W. Cilento. The report of this mission was summarized in THE MEDICAL JOURNAL OF AUSTRALIA of May 31, 1930. A second International Pacific Conference is to be held in Sydney from September 3 to 6, 1935.

An announcement regarding the second conference appears in the May, 1935, issue of *Health*, the journal of the Commonwealth Department of Health. An invitation has been sent to the Health Organization of the League of Nations, which will be represented by Dr. C. L. Park, Director of the Eastern Bureau of the Health Organization. The Federated Malay States will be represented by Dr. G. A. Ryrie, of the Malayan Medical Service, a recognized authority on leprosy. Fiji will be represented by Dr. A. H. B. Pearce, Chief Medical Officer, Suva; and Solomon Islands by Dr. H. B. Hetherington, Senior Medical Officer, Tulagi. Japan's representative will be Dr. Genzo Katoh, Prevention Officer and expert attached to the Ministry of Internal Affairs. China will be represented by Dr. Wu Lien Teh, Director of the Chinese National Quarantine Service; and the Netherlands East Indies by Dr. H. de Rook, Inspector of Public Health, Macassar. It is hoped that New Zealand, Canada and Portugal will be represented. Representatives from the territories administered by the Commonwealth will attend, as well as representatives from the Commonwealth Department of Health and the health departments of New South Wales and Queensland. No finality has been reached regarding the programme, but the draft agenda paper, as published in *Health*, contains much that is of interest and importance. The principal headings are as follow: the distribution of disease generally in the island groups and in those countries in close contact by maritime and

possible air traffic; the occurrence, the treatment and the control of certain diseases (these are named) of special importance to the zone; the epidemiology of the respiratory diseases under tropical conditions; diseases of the eye and of the skin; diseases of non-indigenous residents in the zone; diet, with special reference to climate, race, work, health and survival; administration of public health and medical services under special circumstances of the zone; medical education and the training of native medical practitioners, assistants, dressers, *et cetera*, under the varying conditions existing in the zone; the coordination of research; the correlation of information, including the quarantine aspect, both maritime and air. The draft programme is extensive; every aspect of the health problems of the Pacific is included.

Every student of public health problems and every one interested in international questions will welcome the holding of this conference. From whatever point of view the activities of the peoples in and around the Pacific are approached, the medical problem is encountered. Australia has recognized this and its government has not been unmindful of its duty. It has, in the School of Public Health and Tropical Medicine, provided an institution that is surely destined to serve more and more as a training ground for medical workers in the tropics and as a centre for research in tropical disease. In calling together the second International Pacific Health Conference, the Commonwealth Government has shown once more that it is prepared to accept the responsibilities of leadership. In holding the conference at the School of Public Health and Tropical Medicine at Sydney, it emphasizes the objects for which the school was created. If the conference is to be of real use the discussions must cover every aspect of each subject; there must be no reservations. In the article in *Health*, after a short reference to the 1926 conference, the following sentence appears: "It has been felt that the time might now be opportune for a further conference which, without raising any administrative issues, should result in a useful interchange of experience and a frank discussion on those many special problems which are encountered in common by health administrations throughout this zone." It is difficult to see how administrative issues are to be avoided. One of the items in the draft agenda deals specifically with administration; and discussion of such questions as medical training of native practitioners, the coordination of research and the correlation of information (including the quarantine aspect) must surely include reference to questions of administration. Even if the administration in any country were adversely criticized there would be no power to compel an alteration, and it is possible that strictures passed in the ordinary course of discussion might lead to the adoption of better methods.

Current Comment.

THE RATIONALE OF PASSIVE HYPERÆMIA.

THE therapeutic method of passive hyperæmia developed chiefly by Bier is well known, though probably not employed so much as formerly. It is perhaps a method that might be used more often, for there are cases in which it is logical and seemingly effective. One of the most striking instances of the result of a constant hyperæmia is seen in mitral stenosis, for it is well known that the chronic pulmonary congestion due to the valvular obstruction in the heart is inimical to the development of pulmonary tuberculosis. The two conditions can and do coexist, but very rarely, and it is assumed that the rich blood supply in the engorged lung is responsible for this immunity. Indeed it has been proposed that ligation of a pulmonary vein should be performed deliberately as a therapeutic measure in lung disease. But even if we assume that moderate venous engorgement may be helpful in raising the local resistance of a part, it is still necessary to explain the mechanism involved.

T. W. B. Osborn has made a brief contribution to this subject in a study on the effect of stasis on hæmolytic complement.[1] The amount of complement necessary to consummate the hæmolysis of sensitized blood corpuscles can easily be measured, and Osborn used this method in his work. A sample of blood was drawn from the right cubital vein and a sphygmomanometer armlet used to compress the left arm with a pressure of 100 millimetres of mercury. After fifteen to twenty minutes a second sample was withdrawn from the left arm, and a third sample one-half to one minute after the release of the tourniquet. The results of the tests of the sera obtained in this way showed that in all cases but one stasis produced a rise in the hæmolytic com-

[1] *The Journal of Pathology and Bacteriology*, May, 1935.

plement and that a fall in the complement took place once the circulation was restored to normal. It is interesting that the case which proved an exception showed no change either before or after removal of the congesting arm band, and the subject of this experiment was observed to have cold hands, with some preexisting stasis of the peripheral circulation.

This little experiment is significant, for it is generally agreed that the complement which is essential to complete the work of a hæmolysin is identical with bactericidal complement. Therefore it is possible that the good effects of temporary stasis, as in the employment of Bier's methods, may depend not only on the production of serous exudation from the vessels and the ensuing augmentation of the blood flow, but also on the increase in the bactericidal power of the blood. Against this it may be argued that complement, being non-specific, is always on hand in normal blood and is not likely to be lacking, but it should be remembered that fresh normal serum from a donor has been successfully used in certain cases of infection, its value depending in part on its complement. Previous work on this subject suggests that the reason for the changes observed is the alteration of the carbon dioxide tension of the blood. In the present instance the most important aspect is that additional evidence points to the rational nature of Bier's passive hyperæmia in selected cases.

PSITTACOSIS.

IT seems that the Australian birds of the parrot class, budgerigars and galahs, are frequently associated with the appearance of psittacosis in various European countries. The epidemic in the western world in 1930 caused an intensive research to be undertaken, which resulted in two important discoveries, namely, the isolation of the filter-passing virus by Bedson, Western and Simpson as the causative agent, and the greater safety and suitability of the white mouse as an animal for experiment, compared with avian hosts employed formerly. Strict quarantine laws have since been in force against the unrestricted importation of birds, but as W. Levinthal points out, the indigenous avian population of Europe is already widely tainted, and endemic instances of the disease are on the increase again, especially in Germany and Holland.[1] In Germany the number of human infections during the first six months of 1934 was 150. A further remarkable fact was elicited. The source of the infections was not sick parrots, but apparently healthy budgerigars. It is disturbing to hear that the budgerigar is actually less susceptible to psittacosis than are other species of parrots, and frequently becomes an apparently healthy conveyor of the virus.

Levinthal describes carefully the autopsy findings on mice dying at various intervals after intraperitoneal inoculation with the virus, which is filtered from pooled suspensions of the viscera of a suspected bird. The mouse dies in from two to thirty days showing apathy and with a discharge from the mucous surfaces. Pneumonia is not a feature, as in the human patient, but the chief findings after death point to infection and destruction of the reticulo-endothelial system, together with a sticky exudate into the serous cavities. The virus itself is of large size, only relatively filtrable and rapidly spun out of surface fluid by high speed centrifugalization. It is microscopically apparent as a small coccoid-looking body, highly pleomorphic and resembling *Bacillus tularense*. It can be grown *in vitro*, where it retains its virulence undiminished. Multiplication occurs in the surviving tissue and not in the fluid exudate. Levinthal considers that the pleomorphism is due to modifications in multiplication, caused by unknown factors present in a healthy tissue cell containing the virus. This multiplicity is the most characteristic feature of the virus. He names it *Microbacterium multiforme psittacosis*. Finally, he has immunized mice by vaccination with complete success.

The whole question is very interesting to Australians. F. M. Burnet has shown the presence of the disease among Melbourne birds, and the cause of several outbreaks in the British Isles has been traced to importations from Adelaide. Why is the human disease so rare in this country? Presumably, there are less bird fanciers and less people with a domestic parrot here than abroad, or perhaps manual contact with birds is infrequent. Possibly Australians possess, as a community, a high degree of natural immunity to psittacosis.

[1] *The Lancet*, May 25, 1935.

THE MELBOURNE MEETING.

THE arrangements in connexion with the one hundred and third annual meeting of the British Medical Association, to be held at Melbourne on September 9 to 13, 1935, are being completed. As far as can be gathered at present, the attendance promises to be large, though many members have not advised the Local General Secretary of their intention of being present. Those who have notified Dr. J. P. Major will be interested to know that a handsome volume known as "The Book of Melbourne, Australia" is being prepared for presentation to each attending member. This book, which is now in the press, will contain articles on Victoria, its history and resources, on Melbourne, and on various aspects of Australian life. The contributors include many who are eminent in the scientific, educational and literary life of the Commonwealth, and many beautiful illustrations have been generously supplied by various organizations. The compilation of the book has been in the hands of a subcommittee, of which Dr. W. G. D. Upjohn is chairman. The subcommittee wishes to take this opportunity of thanking all who have so readily come to its assistance.

Abstracts from Current Medical Literature.

GYNÆCOLOGY.

Premenstrual Fever.

V. FEKETE (*Monatsschrift für Geburtshülfe und Gynäkologie*, March, 1935) has investigated the ætiology of slight increases in temperature in normal women, especially during the premenstrual period. Figures ranging from 37·0° to 37·4° C. are frequently noted at this time, and also during the first month of pregnancy. Such increases may be associated with a feeling of depression. Naturally some pathological source for the rise in temperature should be sought, and in those cases in which such examination reveals no cause the author considers that the fever is the result of increased stimulation of the anterior lobe of the pituitary body with a relatively lowered production of follicular hormone. Therefore, for patients with signs of loss of well-being and discomfort he recommends a course of 1,000 mouse units of any preparation of follicular hormone.

Recent Advances in Hormone Therapy.

H. BUSCHBECK (*Monatsschrift für Geburtshülfe und Gynäkologie*, February, 1935) discusses the results recently obtained with very large doses of hormonal preparations in the treatment of various gynæcological diseases. Following the injection of two to three million mouse units of follicular hormone and 35 rabbit units of luteal hormone the complete menstrual cycle can be reproduced in women after oophorectomy. As regards secondary amenorrhœa, excellent results followed the injection of 1,000,000 mouse units of "Progynon B", and eight days later three doses of "Proluton"—20, 40 and 40 clinical units. The author believes that the intensity of the hæmorrhage produced depends more on the amount of follicular hormone injected than on the luteal hormone. This was also noted in cases of scanty menstruation in which 50,000 mouse units of "Progynon" were injected during the first half of the menstrual cycle, generally on the tenth day. The author has had good results in the treatment of dysmenorrhœa with single injections of 20,000 mouse units of "Progynon" or in some instances 50,000 units of "Progynon B". Conditions like *pruritus vulvæ*, when resistant to other forms of treatment, often react to large doses of "Progynon"—80,000 mouse units.

The Treatment of Suppurative Pelvic Conditions.

S. BARJAKTOROVIC (*Monatsschrift für Geburtshülfe und Gynäkologie*, February, 1935) describes a new method of treating suppurative lesions of the uterine appendages by puncture and drainage. The indications for posterior colpotomy are failure of conservative treatment and the presence of a fluctuant mass associated with an irregular temperature. He employs a 20 cubic centimetre "Record" syringe with a needle 10 to 14 centimetres in length and bore of 12 to 15 millimetres. If clear fluid is obtained, nothing further is done. However, if pus is evacuated, it is drawn off as completely as possible and the cavity is irrigated with an equal amount of "Rivanol" solution (3 in 1,000) until the return flow is clear. This method has been used in 157 cases with good results, especially regarding duration of illness and freedom from operative risks. Even if operation is considered necessary because of adhesions *et cetera*, there is an absence of acute infection and no risk of spread during the removal of the appendages.

The Treatment of Fibro-Myomata Uteri.

H. GUTHMANN AND W. ATZERT (*Monatsschrift für Geburtshülfe und Gynäkologie*, February, 1935) present an analysis of the results of treatment of uterine fibroids, comparing surgical measures with radiotherapy. The group comprised 501 patients—245 treated with X rays, 185 operated upon, and 71 not specifically treated. Success was recorded in 93·6% of the X ray cases, as compared with 93% for total hysterectomy and 82·4% following myomectomy. The primary mortality following operative procedures was 4·8%. Post-menopausal symptoms were noted in 87% of the cases in which X rays were used or double oophorectomy had been done, as compared with 63% when one ovary had been left *in situ*. All patients showed an increase in weight and general well-being after either operative or radiological treatment. In about 14% dyspareunia due to involution changes in the vagina was noted both after radiation and operation. The authors conclude that both methods have their place in treatment and give equal results. However, before deciding on the method to be employed one must consider the type of fibroid, the presence of complications, the age of the patient and the necessity or otherwise of continuation of menstruation, endocrine disturbances and, of great importance, the presence of any nervous symptoms.

The Treatment of Condylomata of the Genitalia.

W. N. CHMELEWSKY (*Monatsschrift für Geburtshülfe und Gynäkologie*, April, 1935) discusses the use of the quartz lamp in the treatment of condylomata. At first the lamp is placed at a distance of 50 centimetres and the rays are used for five minutes. The distance is gradually reduced to 30 centimetres and the time of exposure is increased to thirty minutes. Surrounding tissues are protected by cloths. In the author's opinion the ultra-violet rays have a noticeable anæsthetic effect, also a bactericidal action, and gradually cause atrophy of the growths. The use of the lamp does not prevent operative removal at a later date.

Myomectomy.

L. SEITZ (*Monatsschrift für Geburtshülfe und Gynäkologie*, April, 1935) discusses the place of myomectomy in the treatment of uterine fibroids. Opponents of myomectomy declare that the operation is more difficult than hysterectomy, especially as regards hæmostasis; the fibroids are liable to recur in later years, and the scar may rupture in future pregnancies. However, the author believes that these objections are more theoretical than real. Fibroids are usually innocent growths and recurrence is unlikely; the scar should be a firm one if the operation is performed carefully, and there should be no more risk of rupture than after a section for contracted pelvis. The author discusses technical points in the operation and advocates removal of as many fibroids as possible through a single uterine incision. Care is taken to close accurately the resultant cavities. The line of incision can be covered with the round ligament, the vesical peritoneum or on the posterior wall by the *appendices epiploicæ*. The details of two cases, in one of which fourteen fibroids were removed, are given. One of the patients subsequently became pregnant and was delivered at term by section.

Obstructive Lesions of the Uterus.

A. H. CURTIS (*Surgery, Gynecology and Obstetrics*, May, 1935) discusses obstructive lesions of the cervical canal and their causes. He believes that it will eventually be regarded as a surgical sin to use radium, or to make repeated endocervical topical applications, or to apply the cautery within the cervical canal or to amputate the cervix without prolonged and attentive observation thereafter directed to the maintenance of patency of the cervical canal. He considers that insufficient attention has been paid to the free drainage of the uterine cavity.

OBSTETRICS.

A New Active Principle in Ergot and its Effects on Uterine Motility.

M. E. DAVIS *et alii* (*American Journal of Obstetrics and Gynecology*, February, 1935) have accumulated evidence to show that all the desirable physiological activity in ergot does not reside in its alkaloids. The non-alkaloidal fraction has been proved to contain marked oxytocic activity when tested on the human *post partum* uterus. This new active principle is active in three milligramme doses when administered orally. It has been estimated that this new active principle contains less than 1 in 100,000 parts of the so-called alkaloids per

three cubic centimetre dose, whereas the active alkaloids ergotamine and ergotoxin and sensibamine in three milligramme doses produced no uterine response; the new active principle gave the characteristic uterine contractions. The new active principle was used in one hundred *post partum* cases in which kymographic tracings of uterine activity were made for a period of three to four hours. The drug evokes a response in six to fifteen minutes after its administration, and the response lasts for from three to four hours. The usual methods of biological assay were used to control the physiological activity present in the new active principle, and the authors have come to the conclusion that the best method is by inserting a hydrostatic rubber bag for the study of uterine motility. Since this work was done the authors have succeeded in isolating the pure active principle in crystalline form and found it therapeutically active in doses of one milligramme in the *post partum* patient.

The After-Coming Head in Breech Delivery.

J. W. BURNS (*The Journal of Obstetrics and Gynæcology of the British Empire*, December, 1934) is dissatisfied with the accepted method of delivery of the after-coming head. He advocates that as the head is entering the pelvis the child's body be allowed to hang from the vulva; this brings about flexion of the head and brings the nape of the neck well into the sub-pubic angle. The advantages of this method of treatment are: (*a*) There is no traction required on the part of the operator. (*b*) The shortest diameters of the head are rolled through the brim. (*c*) The minimum of force is used to produce flexion of the head, that is, the weight of the child's body. Only when the head has entered the pelvic cavity are the ankles grasped, and then in their most dependent position, and raised up over the mother's abdomen. The author describes in detail the exact method in which this should be carried out to obviate trauma to the mother and infant. The main considerations are gentleness and care.

The Management of Normal Labour.

COMYNS BERKELEY (*The Practitioner*, June, 1935) discusses the management of normal labour. He is of the opinion that a pelvic examination should be made as a routine measure in *multiparæ*, owing to the possibility of a presentation of the cord. As regards sedatives, 1·8 grammes (thirty grains) of bromide of potassium and 1·8 grammes of chloral hydrate are recommended as drugs which can be repeated in four hours. If the patient is troubled with vomiting and if the cervix is not more than half dilated, morphine with scopolamine is suggested and this may be followed in one and a half hours by a rectal injection of paraldehyde, the dose being 0·6 cubic centimetre per kilogram (one drachm per stone) of body weight; not more than 30 cubic centimetres (one ounce) in all should be given. Unpleasant after-effects may be avoided if the drug is dissolved in olive oil, 32 cubic centimetres (eight drachms) of paraldehyde to 150 cubic centimetres (five ounces) of olive oil. This is injected with a Higginson syringe, five minutes being taken for the injection. Throughout labour a careful watch is kept on the maternal pulse and fœtal heart rate.

The Danger of Manual Removal of the Placenta.

W. T. SCHMIDT (*Monatsschrift für Geburtshülfe und Gynäkologie*, December, 1934) reviews the current opinions regarding the high mortality following manual removal of the placenta. He has had a series of 114 cases without any deaths. He attributes his success to careful preparation of the hands and forearms, as well as thorough disinfection of the vagina with swabs soaked in alcohol before the placenta is removed.

Genital Hæmatoma in the New-Born.

E. KLAFTEN AND R. WAGNER (*Monatsschrift für Geburtshülfe und Gynäkologie*, February, 1935) describe three cases of scrotal hæmatoma occurring in infants at birth. In two instances the presentation was vertex, while the third occurred with a breech delivery. While it is easy to appreciate the causation of such traumata with a breech case, especially if the child be large and the delivery prolonged, the ætiology of such a lesion in a cephalic presentation is more obscure. The authors believe that it is caused by severe uterine pressure on the breech when labour has been prolonged. The hæmorrhage is confined to the testis and epididymis on one side, and resolution is not complete for a period of several months.

The Treatment of Puerperal Sepsis.

G. F. GIBBERD (*The Practitioner*, June, 1935), in discussing the treatment of puerperal sepsis, divides the infection into three groups: (i) localized, (ii) spreading to adjacent tissues and the blood stream by lymphatics, and (iii) the formation of thromboses with or without the dissemination of septic emboli. Glycerine has been used to such an extent that excessive indications for its use have been stated. A good technique, such as employed by the late Remington Hobbs, has not been adopted, and it is possible that the widespread employment of this method may have done more harm than good. The author's conclusions are: (i) The technique must be that originally described by Remington Hobbs. (ii) It should not be used as a routine measure, but only when the uterus contains infected blood clot or other *débris*. (iii) Intrauterine applications of glycerine should not be made when there is evidence of spread of infection to tissues outside the uterus. (iv) It is seldom justifiable to subject a seriously ill patient to the discomfort associated with its use. (v) The use of an indwelling catheter is inadvisable. There is no justification for the routine use of the method as a prophylactic measure against infection. In the treatment of septicæmia, vaccines, serum, arsenic, mercury, foreign proteins and aniline dyes all have been suggested from time to time. The author states that from personal experience none of these substances are any good, and that there is reason to believe that some (serum included) may do actual harm. In selected cases blood transfusions are of undoubted benefit.

Labour in the Elderly Primipara.

H. GOECKE (*Monatsschrift für Geburtshülfe und Gynäkologie*, March, 1935) discusses the value of counting the uterine contractions, according to the method of Frey, as a means of estimating when to interfere in the delivery of the elderly *primipara*. He refers to the frequency of premature rupture of the membranes in such cases, even in the absence of any pelvic contraction. In a series of 78 cases the average period between premature rupture of the membranes and the onset of labour was seven and a half hours. Following a critical analysis of his cases he maintains that it is foolish to consider that, if a patient has had a certain number of uterine contractions (150 according to Frey) and delivery has not been accomplished, steps should be taken to terminate the labour. He points out that many of his cases greatly exceeded this total and yet normal delivery occurred. It is of greater importance to watch the fœtal heart carefully and to base any operative procedures on indications of impending fœtal distress.

Puerperal Sepsis and Pyæmia.

F. STÄHLER (*Monatsschrift für Geburtshülfe und Gynäkologie*, May, 1935) discusses the ætiology and treatment of 187 cases of puerperal sepsis. Following conservative methods of treatment there were 139 cases of pyæmia with a recovery rate of 68%. The number of rigors was a sign of uncertain prognostic value. Recovery took place in 55 cases in which the patients had from two to thirty rigors, while there were 34 fatal cases in the same series. In three instances the pelvic veins were ligated, but all three patients died. The author has collected 32 cases of ligature of the veins from the literature, with nine recoveries. This does not compare favourably with the results of conservative treatment already quoted. The author considers that blood transfusion gives the best results in treatment, especially when the donor is a pregnant woman. Similarly, glucose injections are valuable. He found that the use of metallic preparations or of dye substances was of no value.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held in the Medical Society Hall, East Melbourne, on April 3, 1935, DR. R. M. DOWNES, the President, in the chair.

Anæmia in Childhood.

DR. IAN WOOD read a paper entitled: "Anæmia in Childhood" (see page 211).

DR. J. W. GRIEVE, in opening the discussion, congratulated Dr. Wood on his most comprehensive and interesting paper. He thought it might be of interest to discuss iron therapy in infants in some detail. He said that the iron preparations administered were absorbed after conversion into ferrous chloride by the acid gastric juice. It therefore was easy to appreciate the deleterious effect of infections and the presence of hypoacidity and achlorhydria.

Dr. Grieve enumerated the preparations and the dosage commonly employed in infancy: *Ferri et Ammonii Citras*, 12 to 15 grains daily; *Ferrum Redactum*, 3 grains daily; *Ferri Carbonas Saccharatus*, 10 grains daily. He also discussed the value of copper and pointed out that a small amount was necessary for the synthesis of hæmoglobin but not for assimilation of iron. About 80% of medicinal iron preparations contained a little copper.

Josephs stated that one cubic centimetre of 0·5% copper sulphate solution was necessary for each kilogram of body weight. The average iron requirement was 0·2 milligramme per kilogram of body weight, and it was interesting to compare the iron content of the various common preparations, for example: one grain of *Ferrum Redactum* contained 54 milligrammes, one grain of *Ferri et Ammonii Citras* contained 13·5 milligrammes, and one grain of *Ferri Carbonas Saccharatus* contained 17 milligrammes.

Dr. Grieve then emphasized the importance of antenatal care from the standpoint of investigation of the mother's blood and the provision of essential hæmopoietic factors. If the mother presented a hypochromic anæmia, it was necessary to provide an adequate diet, including iron-containing food and inorganic iron in the form of *Ferri et Ammonii Citras*, 20 grains *per diem*, if this could be tolerated. If, on the other hand, the mother's anæmia was of the megalocytic variety, it was advisable to administer hydrochloric acid and the extrinsic factor of Castle in the form of liver, yeast and "Marmite".

Dr. Grieve also discussed congenital hypochromic anæmia briefly and emphasized the importance of adequate iron storage, and suggested the use of *Ferri et Ammonii Citras*, five grains, three times daily. He indicated the value of the adjuncts yeast, "Marmite" and liver, and quoted experimental work to support the value of yeast and "Marmite".

Dr. Grieve pointed out that in hæmolytic anæmia in infants icterus was probable, and that there was often a sudden increase in the anæmia, which was extremely suggestive, and he indicated the value of small repeated blood transfusions to tide the patient over this critical period.

Dr. Grieve had been particularly interested in the condition of *icterus gravis* or erythroblastosis of the newborn. He described in detail the clinical picture of a baby presenting this disease. Some died within a few days, others drifted into the third week, and a few recovered.

Several years ago he had been encouraged by the results of Hampson, who advised the administration of parental serum in ten cubic centimetre doses daily, given intramuscularly, commencing before the second day. Hampson believed that the parental serum supplied an antihæmolytic hormone. Dr. Grieve's results in this condition had been most disappointing. He was inclined to believe that small repeated transfusions would be the most effective treatment. He emphasized that in most hæmolytic anæmias there was a destruction of the erythron and not of the red blood cell only. The resulting picture therefore might be that of aplastic anæmia if the myeloid and platelet systems were affected.

He had seen leuchæmia confused with hæmolytic anæmia in the early stages and he emphasized the importance of a series of blood pictures.

Finally, in the treatment of the acute and subacute hæmolytic anæmias and the severe grades of von Jaksch's anæmia he indicated the value of repeated transfusions.

As regards cœliac disease, Dr. Grieve felt that routine investigation should include a blood picture and that adequate treatment should include dried yeast or "Marmite".

DR. H. BOYD GRAHAM congratulated Dr. Wood on his excellent address and referred to the commonly recurring problem of the school child who was perhaps regarded as being anæmic because of a pale or sallow complexion. On investigation of the blood this child frequently proved to have a normal hæmoglobin content and a normal cell count. In spite of their appearance, these children were not truly anæmic, but they were found sometimes to have absent or deficient hydrochloric acid in their gastric secretion and responded to its administration.

Dr. Graham also referred to an acute anæmia known as Lederer's anæmia, characterized by pallor, collapse, air hunger, usually followed by death. Blood transfusion was sometimes miraculously successful in saving the lives of these patients. Dr. Graham asked if in Dr. Wood's investigations any such cases had been seen.

DR. R. H. SOUTHBY agreed with Dr. Graham that the pale child was by no means always anæmic. Such children frequently came from crowded industrial suburbs, and it seemed that unhygienic surroundings and possibly inadequate diet were capable of producing pallor without true anæmia.

The same applied to the children suffering from congenital syphilis.

Another group of pale children, not truly anæmic, was represented by the babes suffering from acute gastro-enteritis with diarrhœa and vomiting. The explanation was doubtful. One such baby presented extreme pallor, but when its blood was examined by Dr. Webster the red blood corpuscles numbered 6,500,000 per cubic millimetre and the hæmoglobin value was 140%.

Some pale children were found to have a high degree of eosinophilia. One such child failed to react to tests for hydatid disease, but later developed a giant urticaria followed by asthmatic attacks. In this case the eosinophilia was probably allergic in type.

Dr. Southby also described a case of anæmia occurring in one of twins at about the sixth month of age. One of the children was healthy, with normal colour and normal blood picture. The other was lighter in weight and extremely pale; the red blood corpuscles numbered 3,000,000 per cubic millimetre and the hæmoglobin value was 25%. Both children had had the same feeding and other conditions. The anæmic child responded well to the administration of *Ferri et Ammonii Citras*.

DR. IVAN MAXWELL said that in the treatment of anæmia of adults one vitally important consideration was the presence or absence of hydrochloric acid in the gastric secretion. The late Dr. J. F. Wilkinson had been using large doses of iron for twenty-five years, but he had also investigated the gastric content. Absent hydrochloric acid was common over the age of fifty and it was absent in about 25% of all people over the age of fifty-five. Any person showing anæmia should have a test meal done as a routine.

Iron was necessary for metabolism, at least twelve to fifteen milligrammes being required per day, yet many common diets contained only five to ten milligrammes.

It should be remembered that green vegetables were not necessarily rich in iron. Chlorophyll did not contain iron but did contain amino-acids similar in structure to those of hæmoglobin.

DR. JOHN DALE expressed surprise that Dr. Wood had not criticized the work of Dr. McKay, on which the publication of the British Ministry of Health had been based.

One of the recommendations had been that all artificially fed infants should be given additional iron. Dr. Dale also asked in what form iron occurred in the liver.

DR. W. OSTERMEYER asked what were the pharmacological processes taking place in the body after the administration of large doses of iron preparations. There were approximately 38 grains of metallic iron in the body of an average adult man and yet it was common to administer as many as 90 grains of *Ferri et Ammonii Citras* daily, which would represent 17 grains of metallic iron.

DR. MOSTYN POWELL referred to the syndrome of the child presenting pallor and dark rings under his eyes, heavy breath in the morning and lassitude during the day. He had found that this type of pallor responded frequently to the administration of hydrochloric acid without iron.

DR. W. J. NEWING commented on the fact that Dr. Wood had omitted congenital syphilis as a cause of anæmia in children. Dr. Newing had recently investigated two babes who had died with aplastic anæmia, and in both cases the parents had suffered from syphilis of the central nervous system.

DR. GERALD DOYLE described a case of *icterus neonatorum* which he had predicted before birth because he was aware of a family tendency to jaundice. The prediction was confirmed. The parents were not syphilitic.

DR. K. D. FAIRLEY cast some doubt on the correctness of recognized normal figures for hæmoglobin and blood counts. The normal standard varied with different instruments and in different countries. The normal red blood count accepted in America was higher than that recognized in England. Dr. Fairley emphasized the need for adopting some generally uniform standard of normality and also discussed the metabolism of bone marrow in patients suffering from hypothyreoid and hyperthyreoid conditions. He referred also to the life-saving effect of large and repeated blood transfusions in some cases of severe blackwater fever which appeared to be progressing rapidly to a fatal conclusion.

With regard to the importance of copper in blood metabolism, Dr. Fairley said that the question remained unsettled. Other metals, including arsenic, were probably also important as catalysers in the metabolism of iron.

Dr. Ian Wood, in reply, said that he agreed with Dr. Webster that in hospital practice complete blood examinations were asked for by inexperienced clinicians more frequently than was really necessary. In a doubtful case of pallor an estimation of the hæmoglobin was enough as a preliminary. If this finding were normal, as a rule no fuller blood test was indicated.

Referring to Dr. Grieve's warning that it was important not to overlook the possibility of leuchæmia in anæmic children, Dr. Wood said that caution was also necessary in diagnosing leuchæmia in children under the age of two years, because not infrequently leuchæmia was simulated by hæmolytic anæmia and recovery occurred after blood transfusion.

In reply to Dr. Graham, Dr. Wood said that Lederer's type of anæmia was probably only a very acute form of hæmolytic anæmia.

Referring to Dr. Southby's description of the pale child with a high hæmoglobin and red blood corpuscle count in gastro-enteritis, Dr. Wood said that in this case the cause was probably severe dehydration leading to a relative but not an actual polycythæmia.

Referring to the pale type of child described by Dr. Graham and Dr. Powell, Dr. Wood said that he had not tried test meals in these cases nor had he administered hydrochloric acid, but such children frequently did improve with administration of *Ferri et Ammonii Citras*.

Referring to Dr. Fairley's plea for a standardization of normality for hæmoglobin, Dr. Wood said that a rational scheme was to adopt 14 to 15 milligrammes of hæmoglobin per 100 cubic centimetres as the standard, then 100% on most hæmoglobinometers would represent normality.

The apparent or real anæmia in syphilis was probably due to the effect of the toxins on the bone marrow.

In conclusion, Dr. Wood thanked those who had contributed to an interesting discussion.

DR. R. M. DOWNES, the President, conveyed the thanks of the meeting to Dr. Wood, and took the opportunity of welcoming the new Medical Secretary, Dr. C. H. Dickson, who was attending a Branch meeting for the first time in his official capacity.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Royal Prince Alfred Hospital, Sydney, on May 23, 1935. The meeting took the form of a series of demonstrations by the members of the honorary staff. Part of the report of this meeting was published in the issue of August 10, 1935.

Hydatid Cyst of the Liver.

PROFESSOR H. R. DEW and DR. R. A. MONEY showed a patient who had suffered from a hydatid cyst of the liver; the cyst had ruptured into a bile duct and obstructive jaundice had been caused by daughter cysts.

The patient was a male, aged fifty-five years. He was admitted to hospital with the diagnosis of suppurative cholangitis. He had an intense jaundice, high temperature and wasting; and there was a history of recent rigors and vomiting. He was obviously very ill. Some six weeks earlier he had had an attack of pain and jaundice, which was diagnosed as being due to gall-stones. Operation was performed elsewhere and although apparently no gall-stones were found, cholecystectomy was performed and the common duct was explored. No alleviation of symptoms followed; on the other hand, the patient's condition rapidly became worse.

The story was suggestive of a hydatid of the liver, but no investigation was carried out because of the bad condition of the patient. There was a mass in the region of the operation scar, which was thought to be an abscess.

Operation was performed the day after the patient's admission to hospital. In the region of the gall-bladder, after separation of many recent adhesions, a large collection of bile with numerous hydatid daughter cysts was found; the bile was evacuated and the cavity was explored. It was surrounded by bile-stained omentum, extrahepatic in situation, and had the ruptured common bile duct, looking like a ribbon, in its posterior wall. The whole area was cleared out with the sucker and the common bile duct was cleared out by catheter and sucker. The liver was then explored with needles to find the intrahepatic cyst. This was found very deeply situated; it was thick walled and apparently empty and collapsed, so it was left alone. The extrahepatic cavity was drained. The tube drained bile for about three weeks and then gradually closed. Several degenerated daughter cysts were found in the fæces after operation. At a later date the upper margin of the liver was explored; but no sign of any large cysts was found, though the thick-walled collapsed cyst was entered by the needle.

The patient had done very well; the common duct had apparently become patent; and apart from the slight risk of obstruction recurring therein the outlook was good.

It was explained that such a mistaken diagnosis, with removal of the gall-bladder in error, was not uncommon. In this instance the original hydatid cyst had ruptured into one of the hepatic bile ducts; the common duct became blocked and the contents of the cyst were evacuated into the abdominal cavity through the defect in the common duct left by removal of the gall-bladder. Thus a natural evacuation of the original cyst had resulted.

Primary Hepatoma of the Liver.

The second patient shown by Professor Dew and Dr. Money was a girl, aged thirteen years, who had been admitted to hospital with a history of discomfort and slight pain in the upper part of the abdomen, loss of appetite, loss of weight, and a mild degree of anæmia. Her mother had noticed a lump in the abdomen.

On examination a rounded tumour, 12·5 centimetres (five inches) in diameter, just to the left of the mid-line, could be felt. It moved freely on respiration and appeared to be attached to the liver. It was hard along one edge, not cystic and not painful. Tests for hydatid disease gave no reaction. A provisional diagnosis of neoplasm of the liver was made. Hydatid disease was regarded as doubtful, although clinically the tumour was not unlike a cyst.

At operation a primary neoplasm of the liver, of low grade malignancy, was found invading the left lobe. Excision of the left lobe of the liver with the tumour was performed by mattress sutures and the endothermy knife. Microscopic sections showed the tumour to be a primary carcinoma of liver cells—a hepatoma.

Convalescence was uninterrupted, and at the time of the meeting, twelve weeks after operation, the patient was quite well and his general condition was much improved. The prognosis was good. A full course of deep X ray therapy had been given to the liver.

Acute Osteomyelitis of the Right Fibula with Staphylococcal Septicæmia.

Professor Dew and Dr. Money also showed a boy, aged thirteen years, who had been admitted to hospital complaining of pain and swelling above the outer side of his right ankle following a sprain five days previously. There was a history of boils two years previously.

When seen on the day following his admission to hospital he had an exquisitely tender area of inflammation with fluctuation over the lower end of his right fibula, and there were several impetiginous areas over the left thigh, arms and back. For a few hours previously, whilst in hospital, he had complained of pain over the upper end of the left thigh and below the left hip joint, and there was a small localized area of tenderness about five centimetres below the great trochanter of the left femur, on the antero-lateral aspect of the thigh.

The patient's temperature was 39·1° C. (102·4° F.). The total leucocyte count was only 6,500 per cubic millimetre. A blood culture was made and pure colonies of *Staphylococcus aureus* were grown.

At operation a large subperiosteal abscess was opened at the lower end of the right fibula; the underlying bone was opened and pus exuded from the cancellous bony tissue. The infected area of the bone was removed and the cavity was packed lightly with vaseline-spread gauze; the wound was sutured loosely and an unpadded plaster cast was applied to the right foot and leg. At the upper end of the left thigh an incision was made to the periosteum, which appeared œdematous, but no pus was found; however, on drilling the bone, pus and blood exuded under tension. The area of infected bone was removed and the wound was packed lightly with vaseline gauze and loosely sutured. An unpadded plaster spica was applied to the left hip. Cultures from the pus grew *Staphylococcus aureus*. Sixty cubic centimetres of polyvalent antistaphylococcal serum were given by intravenous injection and sixty cubic centimetres by intramuscular injection.

On the following day thirty cubic centimetres were given by intravenous and 30 cubic centimetres by intramuscular injection. The patient's condition improved rapidly, although both plaster casts were blood-stained.

Six days later severe hæmorrhage occurred from the wound in the left thigh; the plaster spica was removed and the wound was repacked with vaseline gauze, as the bleeding had ceased. It appeared to be healing; no bare bone could be felt, and a fresh spica was applied. The blood culture was then sterile.

Fourteen days later a further severe arterial hæmorrhage occurred from the wound in the left thigh. A blood transfusion was given and the old incision was reopened and enlarged. A branch of the lateral circumflex artery of the thigh was found to be bleeding and was ligated. The wound was again packed with vaseline gauze and a firm spica bandage was applied.

No further hæmorrhage occurred and the wound healed rapidly. The cast was removed from the right leg one week later, when the wound had healed. The patient left hospital six weeks after operation and had remained well since. He had full movements at the left hip and right ankle joints.

Acute Ilio-Psoas Abscess of Doubtful Origin.

The next patient shown by Professor Dew and Dr. Money was a male, aged twenty-four years, who for one month before admission to hospital had had an "itchy" right thigh. Small sores appeared after scratching, and the condition proved to be scabies. A week later a swelling appeared in the right upper adductor region and disappeared after the use of hot foments. Then pain appeared in the right groin and the patient was unable fully to extend the right thigh. He was admitted to hospital with the diagnosis of psoas abscess.

On examination there was a swelling above and below the right inguinal ligament, extending from the anterior superior iliac spine to within 2·5 centimetres (one inch) of the mid-line. The mass was tender and obviously fluctuant. This fluctuation extended below the inguinal ligament. The superficial inguinal glands were enlarged and somewhat tender. The temperature ranged to 39·4° C. (103° F.). The thigh was flexed and could not be extended. The spine had normal movement and no tenderness was found there. X ray films showed a small area of bony change in the lower edge of the body of the second lumbar vertebra, which was regarded as tuberculous. The clinical picture did not agree with this finding.

At operation 300 cubic centimetres (ten ounces) of greenish pus were aspirated, and on culture was found to contain *Streptococcus hæmolyticus* and *Staphylococcus aureus*. Three days later the abscess was incised extraperitoneally; over a pint of pus was drained and a tube was inserted. The cavity extended to the brim of the pelvis, but apparently did not extend as far as the spinal lesion. After irrigation and the insertion of a counter-drain below the inguinal ligament the condition cleared up.

Subsequent X ray examination showed the same lesion in the second lumbar vertebra, and it was suggested that it might be of low grade infective origin—osteochondritis. The patient was put on an ambulatory Taylor's back-brace as a safeguard and was told to report for further observation.

The conclusion was that the psoas abscess started probably as a retroperitoneal glandular abscess.

Pedicle and Tube Grafting for Contractures after Nitric Acid Burns.

Professor Dew and Dr. Money also showed a male patient, aged eighteen years, who gave a history that while he was carrying a jar of nitric acid he tripped and fell into the acid as it spilt. He received severe third degree chemical burns of the face, neck, chest, forearms, hands, left knee and right foot. When seen six months later the burnt areas had healed by scar and keloid tissue, but he had an extensive contracture across the front of his neck ("frog neck"), ectropion of the right lower and left upper eyelids, and the lower lip, and inability to close his mouth and to extend his neck and right elbow fully. There was also limitation of movements at both wrist joints and right ankle. Photographs showing these deformities were displayed.

Plastic operations were then commenced in stages. At the first stage the dense wide band of scar tissue was excised from the front of his neck, chin and sternum. The patient's head was fully extended and the gap was filled in by extensive undermining of the lateral flaps and by sliding in pedicle grafts from both supraclavicular and acromial regions. Some slight degree of sloughing took place at the lines of union, due to tension, which resulted in additional keloid formation; but on the whole the result was satisfactory and the patient regained full movements of his neck and was able to close his mouth.

At the second operation, three weeks later, the ectropion of the left upper eyelid was corrected and a new covering was provided for the upper lid with an Esser-Thiersch inlay graft over a Stent mould. The scar was also excised

from the left naso-labial region and the red margin of the upper lip was corrected. The results were satisfactory and the left eye could be closed voluntarily, although further scar tissue remained to be excised from the inner canthus region.

The patient was then given three weeks' holiday at the seaside. At the third operation a long Gillies tube graft, 22·5 by 7·5 centimetres (nine by three inches), was raised from the right acromio-pectoral region and the raw area underneath it was satisfactorily closed after undercutting.

At the fourth operation, three weeks later, the lower end of this tube was freed and implanted into the left side of the patient's face and chin, whence some scar tissue had been excised. This end took well; and it was explained that at the next stage its other end would be severed and used to form a new right lower eyelid, the tube itself being opened out to replace the scar tissue of the right side of the patient's face and chin, the lower lip thus being allowed to resume its normal position. The problems of his right elbow contracture, the dorsum of both wrists and hands and the right ankle remained to be dealt with later, possibly by tube grafts from the abdomen.

Third Degree Burns and Contractures.

The last patient shown by Professor Dew and Dr. Money was a boy, aged seven years, who had received severe burns some eighteen months ago in the country. He was admitted to hospital with complete arm-chest adhesion, with obliteration of the right axilla and much keloid formation. There was a contracture of the right elbow and also an unhealed area on the trunk.

The patient was in poor condition, anæmic and ill-nourished. When his general condition had improved the arm was dissected off the thorax and a pedicle flap operation from the pectoral region was done for the reconstruction of the right axilla. Multiple Thiersch grafts, also some pinch Reverdin grafts, were employed to cover the raw areas.

Rapid recovery of function followed and the patient's general health was excellent. It was explained, however, that further operations were necessary for release of scars and for the contracture in the elbow and axilla. Photographs showing the patient's appearance before and after plastic operations were demonstrated.

Sarcoma of the Uterus.

DR. H. H. SCHLINK and DR. E. THOMSON showed a patient who had been operated on for sarcoma of the uterus. It was explained that although most text books stated that sarcoma of the uterus was a rare disease, they thought that many initial sarcomatous degenerations of fibromyomata were removed without the surgeon or pathologist realizing the lurking danger contained within them. The macroscopic appearance of very early changes passed unnoticed by the surgeon splitting the specimen, and the pathologist did not examine more than a small section of the tumour, and, even if the whole mass were examined by celloidal sections, it would often be very difficult to differentiate between the sarcomatous and normal cell in the initial metamorphosis from the latter to the former. At the Royal Prince Alfred Hospital they had met within the last two years three cases of sarcoma of a fibroid after treatment with radium; this might or might not be due to the radium. It was thought that the radical operative treatment of fibromyomata as practised at the Royal Prince Alfred Hospital saved many a woman from dying of sarcoma of the uterus.

Occasionally sarcoma of the uterus might spring from the normal uterine wall, but usually it occurred as a malignant change in a myoma, so that it might be called malignant myoma or myosarcoma. The gross appearance of a well advanced case was characteristic, the whorled and striated appearance of the fibroid was lost, the cut surface was homogeneous and brain-like, and the tumour was soft and might be of a raw beef or yellowish colour. Cyst formation and hæmorrhage were occasionally met with. Microscopically the tumour, when established, was composed of large fusiform cells, in many of which the nuclei were remarkably large and showed numerous mitoses. According to Boyd it was almost impossible to be certain whether these cells were derived from plain muscle or from fibroblasts.

The spread of the growth was by direct burrowing into the surrounding tissues and by the veins, which were thin walled and often appeared as structureless channels running between the fibres; the arteries, although usually of a capillary nature, were more resistant to invasion. When the growth invaded a vein, cells might be broken off and carried away by the stream to form secondary deposits in the lungs, liver or brain.

The uterine sarcoma in the patient shown was exceptional, on account of the youth of the patient and the apparent rapidity of the growth. Had striated muscle been found, there would have been an inclination to classify the growth under the embryonal tumours called rhabdosarcoma, the grape-like sarcoma of the cervix and vagina usually found in young children.

The patient was a woman, aged twenty-two years, who had been born in the country. She had complained of menorrhagia and intermenstrual leucorrhœa over a period of twelve months. She had lost 6·3 kilograms (one stone) in weight in the last six months and had complained of anorexia for two months.

The menstrual history was that menstruation began when the patient was eleven years old. The type was twenty-eight days and the duration nine to twelve days. The last menstrual period had occurred on March 24, 1935. The patient gave a history of appendicectomy nine years ago. She was treated for scoliosis eight years ago.

On examination the patient was *virgo intacta*. The uterus was regularly enlarged to the size of a three months pregnancy. Its consistence was hard, its contour was smooth, and its mobility free. The fornices were clear. The patient had no pain.

On April 16, 1935, a blood count was made. The erythrocytes were found to number 2,700,000 per cubic millimetre; the hæmoglobin value was 35% and the colour index was 0·64. The leucocytes numbered 5,200 per cubic millimetre. Blaud's pills were given, at first two three times a day and later six being given.

On April 17, 1935, an Aschheim-Zondek test for pregnancy gave no reaction. On April 18, 1935, the patient was examined under anæsthesia and uterine scrapings were taken. Examination of the scrapings failed to reveal malignant change, the lutein phase of endometrium being noted.

On April 26, 1935, the morning of operation, the patient was given a blood transfusion of 600 cubic centimetres of Type III blood. Her blood count at the time of the transfusion was: erythrocytes, 3,190,000 per cubic millimetre; hæmoglobin value, 56%; colour index, 0·9. The slight improvement was thought to be due to the Blaud's pills.

After the operation another transfusion of 600 cubic centimetres of Type III blood was given.

On April 26, 1935, operation was performed. When the abdomen was opened a large regular uterus was discovered, and in view of the pre-operative diagnosis of sarcoma a total panhysterectomy with removal of the tubes and ovaries was done. The appearance on section was frankly sarcomatous, which was verified by frozen section. Convalescence was uneventful.

On May 14, 1935, a blood count showed that the erythrocytes numbered 4,900,000 per cubic millimetre, the hæmoglobin value was 90%, and the colour index was 0·91. On May 17, 1935, the patient was discharged from hospital. The pathological report on the specimen stated that the uterus was markedly enlarged and was globular in shape. On the superior surface of the fundus there was a small fibroid. On section the uterine wall contained a large tumour mass about the size of an ostrich egg. This mass had compressed the uterine cavity and flattened it from side to side. The mass appeared to be fairly well encapsulated and did not appear to be invading the remaining myometrium at any point. The mass was soft and gelatinous and was apparently undergoing considerable myxomatous degeneration. There were scattered small

red areas throughout the mass. The appearances indicated a sarcoma. The endometrium of the uterus was congested.

On microscopic examination tissue from the tumour of the uterus showed the structure of a sarcoma. The cells composing the tumour were of two types: (i) round cells and (ii) spindle cells, the cells occurring in about equal proportions. The round cells occurred in all parts of the tumour. They were very irregular in size, and many very large cells could be seen. All cells were extremely hyperchromatic. The nuclei of the cells were large and were intensely hyperchromatic. In some cells there appeared to be an attempt at mitosis, but true mitotic figures were not prominent. These round cells were the more actively malignant of the two types. The spindle cells occurred in large bundles arranged in whorls. They were large cells, moderately hyperchromatic, with irregular nuclei. They did not exhibit, however, the same active character as the round cells. As noted macroscopically the tumour appeared to be encapsulated. Sections taken from the edge of the tumour showed a clear and abrupt line of demarcation from the uterine wall. No actual invasion of the uterine wall could be found. Degenerative change was occurring in the tumour, and this appeared to be of a myxomatous type. Sections from the ovaries showed in one part the formation of a lutein cyst and in other parts simple follicular cysts. There was no evidence of tumour growth. Sections from the Fallopian tubes showed nothing of note. The diagnosis was round and spindle celled sarcoma of the uterus.

Urinary Calculi and Enlargement of the Prostate.

DR. J. W. S. LAIDLEY showed two patients. The first was a man, aged seventy-three years, who had complained of difficulty of micturition for forty years. Twenty years previously a post-Neisserian stricture was dilated and the patient's condition relieved. After dilatation he was provided with a sound, which he had passed on himself at intervals ever since. He took no antiseptic precautions. During the past three years his difficulty had returned, together with frequency and great pain at the end of micturition, and terminal hæmaturia. On examination the prostate was found to be moderately enlarged, the urine was foul, and a sound was obstructed by a small calibre urethral stricture. After the stricture had been dilated it was still found to be impossible to pass an instrument into the bladder, owing to the end of the sound impingeing upon a large calculus. An X ray picture revealed multiple small prostatic calculi, a very large vesical calculus, about seven centimetres in diameter, and two symmetrical ureteral calculi, each about one centimetre in diameter and occupying the terminal centimetre of each ureter. The vesical calculus was crushed and evacuated after considerable difficulty owing to the urethral stricture and also to a large prostatic middle lobe which had hitherto passed undetected. The patient's bladder cleaned up quickly and well, and without further interference he was allowed to leave hospital, able to pass a good stream of urine and without undue frequency or dysuria. Dr. Laidley said that the patient's ureteral orifices were golf-hole in character and the probability was that he would pass his ureteral calculi into the bladder in due course. They would remain in the post-prostatic pouch and would require to be crushed.

To sum up, this man was suffering from: (i) a urethral stricture, (ii) hypertrophied prostate, (iii) prostatic calculi, (iv) vesical calculus, and (v) bilateral ureteral calculi.

Polycystic Disease of the Kidney.

Dr. Laidley's second case was one of polycystic disease of the kidney. The patient was a man, aged thirty-five years, who had complained of hæmaturia for three weeks and left lumbar pain in attacks for two years. The urine was dark in colour and the appearance of blood was not related to the left lumbar pain. On examination a large left kidney could be palpated with ease. A cystoscopic examination was carried out and a pyelogram taken of the left side. Seven cubic centimetres of sodium iodide were injected, the injection being stopped before the onset of local discomfort. The pyelogram showed a kidney which was almost certainly affected by a large newgrowth of the upper pole. The upper calyx was tenuous, distorted and elongated, while the lower calyces appeared normal. As a routine measure a differential functional test was carried out and both kidneys were found to secrete very poorly. A pyelogram of the right side was then taken and showed a very typical advanced polycystic kidney. A week later a pyelogram of the left side was again taken and sodium iodide was injected to the point of discomfort. The patient did not complain until twenty-five cubic centimetres had been injected. The comparison with the first pyelogram was remarkable. The upper calyx, which had hitherto been under suspicion, had filled out and showed typical polycystic deformities. The lower calyces, which had previously appeared normal, also showed definite polycystic changes. On further reviewing the case, the lower pole of the right kidney could be felt below the costal margin, but it was difficult to decide that it was enlarged. The blood urea was found to be 77 milligrammes *per centum*, and it was found that the patient could not concentrate urea beyond 1·35%.

The case was thus undoubtedly one of polycystic disease and the early diagnosis of hypernephroma was proved to be incorrect. Dr. Laidley said that the lesson to be learned was the misleading appearance of many pyelograms when the renal pelvis had not been properly filled. When pyelography was carried out by the retrograde method, complete filling might be safely obtained by injecting to the point of discomfort. With intravenous pyelography incomplete filling was of frequent occurrence, and in a few cases might be partly remedied by abdominal compression while the opaque medium was being secreted.

Chorionepithelioma of the Uterus.

DR. CLEMENT CHAPMAN showed two patients suffering from chorionepithelioma of the uterus. He wished to draw attention to a rare condition, which must be ever kept in mind in cases of irregular hæmorrhage after abortion or childbirth. The diagnosis could be made certain only by curettage and microscopic examination of the removed material by a competent pathologist. Two pitfalls should be noted: (i) The removed material might be too necrotic to show any structure. (ii) The chorionepithelioma might be in the form of a lump in the uterine muscle, resembling a myoma.

The first patient had been treated early and successfully by a hysterectomy, after her exsanguinated condition had been improved by blood transfusion. The second patient came under observation at a late stage and her condition proven inoperable by laparotomy at another hospital in 1933; she was subsequently treated by lead injections without improvement. She was transferred to the Royal Prince Alfred Hospital, where she was treated by two applications of radium and a complete course of deep X ray therapy. Improvement had been maintained and the original growth, reaching to the umbilicus, had now quite disappeared. This patient had lived nearly three years and it was hoped that her cure was permanent.

Otitic Streptococcæmia.

DR. GARNET HALLORAN showed a patient, aged thirteen years, who had had otitic streptococcæmia. On October 20, 1934, the child was admitted to hospital with right acute *otitis media*. The drum was red, but not bulging. A right paracentesis was performed. Six days later the temperature was 38·9° C. (102° F.), but there was no mastoid tenderness. On October 31, 1934, the patient had a rigor; there was still no mastoid tenderness. On November 1, 1934, blood culture was performed and *Streptococcus hæmolyticus* was grown; the leucocytes numbered 9,300 per cubic millimetre. The following day operation for right acute mastoiditis was performed. The mastoid was injected, but pus was found only in the vicinity of the antrum. The lateral sinus was exposed, the *dura mater* appeared healthy, and no perisinus abscess was present. On November 6, 1934, severe pain was felt on the right side of the chest. It was thought that this was possibly septicæmia with a pulmonary infarct. No

abnormal sounds were heard in the chest. Blood culture on the following day again yielded a growth of *Streptococcus hæmolyticus*. The right internal jugular vein was ligatured and the right lateral sinus opened; no intramural clot was found. On November 8, 1934, antistreptococcal serum was given intravenously in doses of 70, 110 and 180 cubic centimetres. The next day 250 cubic centimetres of the serum were given. On November 13, 1934, the blood count revealed 3,250,000 red cells and 5,500 leucocytes per cubic millimetre. Three days later a transfusion of 550 cubic centimetres of citrated blood was given, and on the following day the mastoid wound was clean. On November 18, 1934, there was a tender swelling of the neck over the jugular vein, and two days later a purulent discharge from the jugular wound. On November 26, 1934, blood culture was attempted and was unsuccessful after 144 hours.

On December 12, 1934, the patient had a persistent wry-neck to the left. It was very tender in the left posterior triangle, suggesting a cervical spinal involvement. X ray examination of the cervical spine revealed no vertebral osteomyelitis or displacement; there was no abnormality within the pharynx and no retropharyngeal abscess. Attempts at blood culture on the following day were unsuccessful after 144 hours. On December 15, 1934, the trismus with wry-neck to the left persisted. Leucocytes numbered 8,900 and red cells 4,310,000 per cubic millimetre. Five days later X ray examination of the cervical spine revealed no abnormality. On January 7, 1935, the leucocytes numbered 5,700 per cubic millimetre. A week later the trismus was diminishing; the wry-neck, however, persisted. (This was regarded as a post-inflammatory reaction.) On January 17, 1935, an X ray picture showed the neck to be still in extension to the left, but no bony abnormality was detected. At the time of the meeting (May 23, 1935) the patient's general condition was very good. The mastoid wound had healed and the drum was dry. The range of cervical movement had greatly improved to the right.

Dr. Halloran said that the case was interesting because: (i) Septicæmia accompanied acute suppurative *otitis media* without evidence of mastoiditis. (ii) No intramural clot was found in the lateral sinus. (iii) The cause of trismus and fixation of the cervical spine was undetermined for four months. (iv) The dosage of serum administered was unusual.

(To be continued.)

ANNUAL MEETING, MELBOURNE, 1935.

A DINNER will be given by Victorian returned medical officers to all visiting medical officers from other States, New Zealand and overseas who have been on service. The dinner will be held on Tuesday, September 10, at 6.30 p.m., at the Windsor Hotel, Spring Street, Melbourne, and will finish in time to allow those present to attend the reception of the President of the British Medical Association. Visiting medical officers who intend to be present are asked to forward their names to the Honorary Secretary, Dr. H. J. Williams, 100, Collins Street, Melbourne, C.1.

Copies of the "Booklet of Excursions" have been forwarded to the secretaries of the several Branches of the British Medical Association throughout Australia. These booklets can be had on application in writing to the secretaries of the Branches of the various States. They contain full information with regard to all tours, excursions *et cetera*.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Price, John William Lennox, M.B., B.S., 1933 (Univ. Sydney), Base Hospital, Orange.

STAWELL ORATION.

THE second Stawell Oration will be delivered by Sir Thomas Dunhill, K.C.V.O., C.M.G., on Friday, September 6, 1935, at 8.15 p.m., in the Medical Society Hall, Albert Street, East Melbourne. The subject of the oration will be "Diaphragmatic Hernia—Non-Traumatic". All members of the Association are invited to be present.

Medical Societies.

THE MEDICAL DEFENCE ASSOCIATION OF TASMANIA.

THE annual meeting of the Medical Defence Association of Tasmania was held at 172, Macquarie Street, Hobart, on February 6, 1935, DR. R. G. SCOTT, the President, in the chair.

The minutes of the last annual meeting and the balance sheet were read and confirmed.

The annual report revealed that there was no business of importance transacted during the year in the way of claims, and this was accepted as again very satisfactory.

The total assets of the Association were steadily mounting up and now amounted to £780. During the year another £100 had been placed on fixed deposit. The financial statement is published herewith.

It was resolved, on the proposal of Dr. W. W. Giblin, that inquiries be made from insurance companies as to their willingness to insure the members so that the resources at the disposal of the Association might be greater still in case of emergency.

The Secretary pointed out that, although the affairs of the Association had gone along peacefully up to the present, there would come a day when some member would need assistance. It would then suddenly become of the utmost importance that everything should be in order.

According to the rules, should any member not pay his subscription before the last day of December his name shall be struck off the rolls. As with an insurance company, no claims need be entertained if the premium was overdue.

Furthermore, the office-bearers should be nominated twenty-one days before the day of the annual meeting. For two years notices had been sent out, but no nominations had been received and the last year's office-bearers had carried on. The assessment of assistance, to a large extent, depends upon the decisions of the committee.

List of Office-Bearers, 1935.

The following is a list of office-bearers:

President: Dr. R. G. Scott.

Committee: Dr. B. Ingram (Sorell), Dr. J. S. Reid, Dr. W. E. L. H. Crowther, Dr. T. H. Goddard, Dr. G. Sprott, Dr. F. W. Fay.

Secretary and Treasurer: Dr. C. N. Atkins.

Statement of Receipts and Payments.

RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
To balance as at Feb. 23, 1934	92	15	7	By Fixed Deposit	100	0	0
„ Members' Subscriptions ..	21	2	0	„ Bank Fees and Exchange ..	0	10	7
				„ Stamps	0	10	0
				„ Cash in Hand	2	10	3
				„ Cash in Bank	10	6	9
	£113	17	7		£113	17	7

List of Assets.

	£	s.	d.
Cash at Bank—E. S. and A., Hobart	10	6	9
Cash in Hand	2	10	3
Fixed Deposits with E. S. and A. Bank, Hobart	767	9	2
	£780	6	2

Audited and found correct.

C. A. BENNETTO,
Chartered Accountant (Aust.),
Auditor.

February 4, 1935.

Correspondence.

THE USE OF 300 KILOVOLTS PEAK IN X RAY THERAPY.

SIR: Dr. A. T. Nisbet's contribution, published in the journal of June 15, 1935, dealing with certain aspects of deep X ray therapy, contains much of interest and value, but there are some contentious matters which stimulate this communication.

Although "peak K.V." has for long been recognized as a somewhat unsatisfactory descriptive term, Dr. Nisbet apparently advocates or excuses its use in preference to the term "effective K.V." or "equivalent K.V.", as recommended by the International Committee for Radiological Units. On this basis he takes Mr. Strong, the Physicist to the New Zealand Branch of the British Empire Cancer Campaign Society, to task for "upsetting workers". I feel that it is as logical to describe X rays in terms of peak kilovoltage as it would be to describe the average level of a country in terms of its highest mountain, and that it should be discarded as a descriptive term.

Mr. Strong's investigations of four alleged 200 kilovolt peak machines in New Zealand showed that the peak kilovoltage ranged from 166 to 193, and the effective kilovoltage from 104 to 116. The effective wave-lengths, using one or two millimetres copper and one millimetre aluminium filtration, were correspondingly unsatisfactory by spectroscopic tests. It was apparently not feasible to bring these machines up to requirements by minor adjustments.

It is abundantly evident that these machines are unsuitable for modern deep therapy. Mr. Strong's condemnation was fully warranted and he is to be congratulated in exposing the present state of affairs and in rousing those concerned from a state of complacency. It is to be hoped that his work may initiate the establishment of efficient radiotherapy in New Zealand public hospitals.

Dr. Nisbet's contention that a fundamentally faulty wave form can be adequately compensated by the use of "the correct filters" is also open to serious objection. Such a view requires the assumption that filters are capable of sharply demarcating longer wave-lengths from shorter wave-lengths. Unfortunately no such filters are at present in existence, nor is there any likelihood of their advent in the near future. The usefulness of filters in deep therapy is limited by the fact that, for practical purposes, they conform to the exponential laws of absorption.

Turning to Dr. Nisbet's measurements, I append two tables. Table A is merely a reprint of his results for the dosage times for 5 *r*: (*a*) at the surface and (*b*) at ten centimetres depth, under various conditions of kilovoltage and filtration, the aluminium filter being ignored.

Table B represents an analysis of the percentage depth dosage for each kilovoltage and filter, calculated from Table A, and will make strange reading to most radiologists. If this table were to be relied on, it would seem that as far as depth dosage is concerned increases of kilovoltage above 200 and of filtration beyond one millimetre copper are actually disadvantageous. For example, at 200 kilovolts, using one millimetre copper filter, the depth dose is 37%, while at 300 kilovolts with three millimetres copper it is only 29%. This table is so contrary to the findings of numerous investigators and to the accepted principles of radiation physics that the conclusions based thereon should be accepted with considerable reservation. It is also difficult to justify an advocacy of 275 kilovolt apparatus on the basis of this table.

TABLE A.

Filter. (Millimetres of Copper.)	200 Kilovolts.		225 Kilovolts.		250 Kilovolts.		275 Kilovolts.		300 Kilovolts.	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
1	17	46	13	32	9	24	7	20	6	16
2	26	82	18	54	12	46	10	30	8	26
3	33	115	22	74	14	45	11	37	9	31
4	45½	178	33	113	22	67	16	49	13	40

TABLE B.

Filter. (Millimetres of Copper.)	200 Kilovolts.	225 Kilovolts.	250 Kilovolts.	275 Kilovolts.	300 Kilovolts.
	%	%	%	%	%
1	37·0	40·6	37·5	35·0	37·5
2	31·8	33·4	26·1	33·3	30·8
3	28·6	29·8	31·2	29·8	29·0
4	25·6	29·2	32·8	32·7	32·6

At the present time the question of installation of new deep therapy apparatus is under consideration by many hospital authorities and private practitioners. The efficacy of cancer treatment will in part be influenced by the decisions reached. Where new apparatus is to be acquired, I would strongly urge the installation of the constant potential type in preference to one of the types in which pulsating potential is applied to the tube, for the following reasons:

1. In the constant potential type the calibration kilovoltage is for practical purposes equivalent to the effective kilovoltage, which is in turn a reliable index of wave-length and penetration value. In pulsating potential outfits, on the contrary, there is no such equivalency and the ratio of peak kilovoltage to effective kilovoltage varies from machine to machine.

2. It has been demonstrated for many years that peak kilovoltage is an unsatisfactory descriptive term and should be replaced by effective kilovoltage as the term whereby techniques can be comparably described and understood.

3. The radiation output of constant potential machines is remarkably constant and is not subject to the many variations which affect pulsating potential machines. In pulsating potential machines the radiation output varies with change of tubes even of the same manufacture, with the age of the same tube, with readjustments of the high and low tension circuits *et cetera*. These variations do not apply to constant potential machines, which, when once calibrated, show little tendency to change. It is not suggested, however, that this consideration should excuse the non-use of proper dosimeters in X ray departments.

4. The radiation outputs of different makes of constant potential apparatus are almost identical in quantity and quality. Dosage techniques are therefore strictly comparable and can be duplicated on different machines.

5. The current applied to the tube by constant potential machines is 100% useful current and the resultant radiation spectrum is eminently suitable for deep therapy purposes.

6. It requires a pulsating potential machine of approximately 235 to 275 peak kilovolts to deliver the same effective kilovoltage as a 200 kilovolt constant potential machine. For the same effective kilovoltage the insulation requirements are therefore greater for the pulsating potential machine, a factor of some importance in humid atmospheric conditions.

7. Efficiency. As far as the important question of dose distribution is concerned, that produced by cross-firing with a 200 kilovolt constant potential apparatus leaves little to be desired. The question of the existence of any greater inherent cancericidal property of rays generated at higher kilovoltage is as yet so uncertain that the installation of machines of higher than 200 kilovolts constant potential is not warranted, except for research purposes. For modern therapy such a machine meets all present requirements and permits the use of techniques which have been elaborated by Coutard and Pfahler, and which have contributed so much to recent improvements in results.

8. Economy. A 200 kilovolt constant potential machine, complete with valves and a protected type of X ray tube, can be installed in New Zealand (and presumably in Australia) for approximately £1,250. It would, in my opinion, be better to install two such machines than a single machine of 300 kilovolts costing £2,500 to £3,000.

It is realized that much ineffective deep therapy has been and is being carried out throughout the world and that one of the contributory causes of this has been the variability of radiation output, both in quantity and quality, from different apparatus. With the type of apparatus described one of the main obstacles to efficient treatment would be removed and the records, as far as the quality of radiation is concerned, would become acceptable for statistical purposes. Successful technical procedures could be accurately followed and satisfactory results thereby duplicated.

Yours, etc.,

BRUCE MACKENZIE.

25, Princes Street,
Auckland,
New Zealand,
July 24, 1935.

University Intelligence.

JUBILEE OF THE ADELAIDE MEDICAL SCHOOL.

THE Medical School of the University of Adelaide is this year celebrating the jubilee of its opening in March, 1885.

Arrangements are in progress for a public *conversazione* at the University of Adelaide on the afternoon and evening of August 30 and 31. Demonstrations will be given in the different departments of the medical school to illustrate some of the advances made in different branches of medicine during the fifty years of the school's existence. One of the last labours of the late Dr. A. A. Lendon was the preparation of a short history of the school. This will be distributed as a souvenir of the occasion.

On September 18 a special congregation of the University will be held, at which honorary degrees will be conferred on various distinguished medical visitors from overseas. On the same evening there will be a dinner in the University refectory to serve as a reunion of old graduates of the school. Notices of the dinner are being issued to all old graduates in Australia. Lord Horder, Sir Thomas Dunhill, Dr. Francis Muecke and other distinguished visitors from overseas have already accepted the invitations to these celebrations.

As part of the celebrations the movement is also on foot to establish an Archibald Watson Prize in Anatomy.

Proceedings of the Australian Medical Boards.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Temperley, Georgina, M.B., B.S., 1929 (Univ. Melbourne), Public Hospital, Hobart.
Ebsworth, John Francis, M.B., 1928 (Univ. Melbourne), Public Hospital, Hobart.
Fagan, Kevin James, M.B., B.S., 1933 (Univ. Sydney), Public Hospital, Hobart.
Porter, John Rees, M.B., Ch.B., 1916 (Univ. Melbourne), Repatriation Hospital, Davey Street, Hobart.
Murphy, Gregory Bernard Vincent, M.B., B.S., 1932 (Univ. Melbourne), Public Hospital, Launceston.

QUEENSLAND.

THE undermentioned has been registered, pursuant to the provisions of *The Medical Acts*, 1925 *to* 1933, of Queensland, as a duly qualified medical practitioner:

Oxby, Donald Russell Hughes, M.B., B.S., 1935 (Univ. Melbourne), Brisbane.

Obituary.

HENRY ST. JOHN MITCHELL.

WE regret to announce the death of Dr. Henry St. John Mitchell, which occurred on August 1, 1935, at East Malvern, Victoria.

THE GEORGE MACDONALD TESTIMONIAL FUND.

THE undermentioned subscription has been received for the George Macdonald Testimonial Fund:

£2 2s.: E. F. Fisher.

THE STAWELL MEMORIAL FUND.

THE undermentioned subscriptions have been received for the Stawell Memorial Fund:

£5: E. W. Fairfax.
£2 2s.: A. G. Owen.
£1 1s. 6d.: W. P. Griffiths.

Books Received.

CATECHISM SERIES: PHYSIOLOGY; Fourth Edition; 1935. Edinburgh: E. and S. Livingstone. Crown 8vo., pp. 158. Price: 1s. 6d. net.

CATECHISM SERIES: MEDICINE; Third Edition; 1935. Edinburgh: E. and S. Livingstone. Crown 8vo., pp. 380. Price: 1s. 6d. net.

PREPARING FOR MOTHERHOOD, by M. A. Peck, S.R.N.; 1935. Melbourne: Fitchett Brothers. Demy 8vo., pp. 72. Price: 1s. net.

A BRIEF OUTLINE OF MODERN TREATMENT OF FRACTURES, by H. Waldo Spiers, A.B., M.D.; 1935. London: Baillière, Tindall and Cox. Royal 8vo., pp. 148, with 109 illustrations. Price: 9s. net.

MIDWIFERY, by Ten Teachers, under the direction of Clifford White, M.D., B.S., F.R.C.P., F.R.C.S., F.C.O.G., edited by Sir Comyns Berkeley, J. S. Fairbairn and C. White; Fifth Edition; 1935. London: Edward Arnold and Company. Royal 8vo., pp. 752, with illustrations. Price: 18s. net.

Diary for the Month.

AUG. 20.—New South Wales Branch, B.M.A.: Ethics Committee.
AUG. 20.—Tasmanian Branch, B.M.A.: Council.
AUG. 21.—Western Australian Branch, B.M.A.: Branch.
AUG. 21.—Victorian Branch, B.M.A.: Clinical Meeting.
AUG. 22.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUG. 23.—Queensland Branch, B.M.A.: Council.
AUG. 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUG. 28.—Victorian Branch, B.M.A.: Council.
AUG. 29.—South Australian Branch, B.M.A.: Branch.
AUG. 29.—New South Wales Branch, B.M.A.: Branch.

Medical Appointments.

Dr. K. H. Grieve (B.M.A.) has been appointed Medical Officer, Office of the Director-General of Public Health, New South Wales.

* * *

Dr. C. A. Hogg (B.M.A.) has been appointed a Member of the Boards of Official Visitors to the Mental Hospitals at Parramatta and Rydalmere, New South Wales.

* * *

Dr. E. H. Derrick (B.M.A.) has been appointed Analyst in pursuance of the provisions of *The Health Acts*, 1900 *to* 1934, Queensland.

* * *

The undermentioned have been reappointed to the Honorary Staff of the Adelaide Hospital, South Australia: Dr. J. R. S. G. Beard (B.M.A.), Gynæcologist; Dr. E. C. Black (B.M.A.), Anæsthetist; Dr. J. B. Cleland (B.M.A.), Pathologist; Dr. C. Gurner (B.M.A.), Assistant Deep X Ray Therapist; Dr. S. R. Hecker (B.M.A.), Anæsthetist; Dr. H. M. Jay (B.M.A.), Aural Surgeon; Dr. G. A. Lendon (B.M.A.), Assistant Physician; Dr. R. F. Matters (B.M.A.), Assistant Gynæcologist; Dr. F. J. B. Miller (B.M.A.), Assistant Ophthalmologist; Dr. H. A. McCoy (B.M.A.), Radium Therapist; Dr. H. E. Pellew (B.M.A.), Anæsthetist; Dr. W. A. Pryor (B.M.A.), Anæsthetist; Dr. W. C. Sangster (B.M.A.), Assistant Aural Surgeon; Dr. M. Schneider (B.M.A.), Assistant Ophthalmologist; Dr. B. H. Swift (B.M.A.), Assistant Gynæcologist; Dr. J. S. Verco (B.M.A.), Deep X Ray Therapist; Dr. N. T. Wigg (B.M.A.), Anæsthetist.

* * *

The undermentioned appointments have been made in the Tuberculosis Department of the Adelaide Hospital, South Australia: Dr. D. R. W. Cowan (B.M.A.), Honorary Physician; Dr. H. W. Wunderly (B.M.A.), Honorary Assistant Physician; Dr. J. W. Rollison (B.M.A.), Honorary Clinical Assistant; Dr. J. L. Hayward (B.M.A.), Honorary Clinical Assistant.

* * *

Dr. R. M. Glynn (B.M.A.) has been reappointed Honorary Ophthalmologist at the Parkside Mental Hospital, South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xii, xiv, xv.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.

PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Radiologist, Junior Resident Medical Officers.

THE OTAGO HOSPITAL BOARD, OTAGO, NEW ZEALAND: Resident Medical Officer (Senior).

WESTERN SUBURBS HOSPITAL, SYDNEY, NEW SOUTH WALES: Medical Superintendent.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointment and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.